The
CHEMICAL AGE

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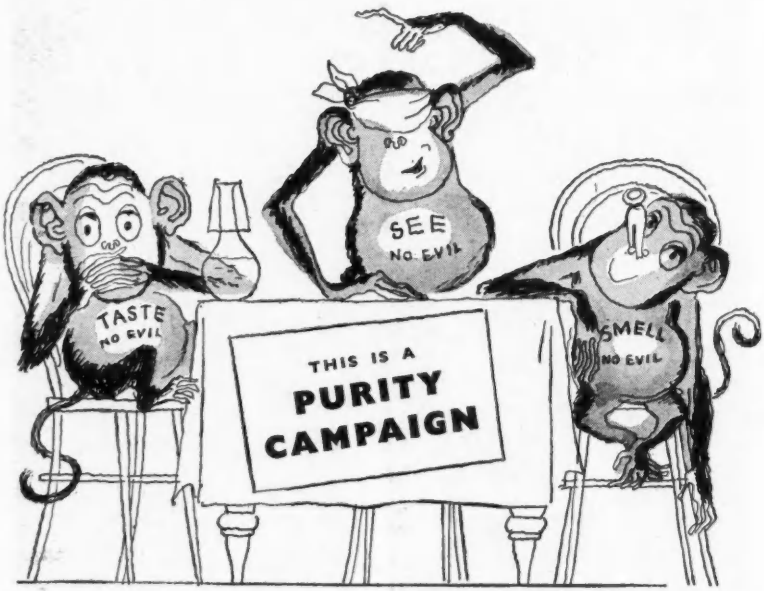

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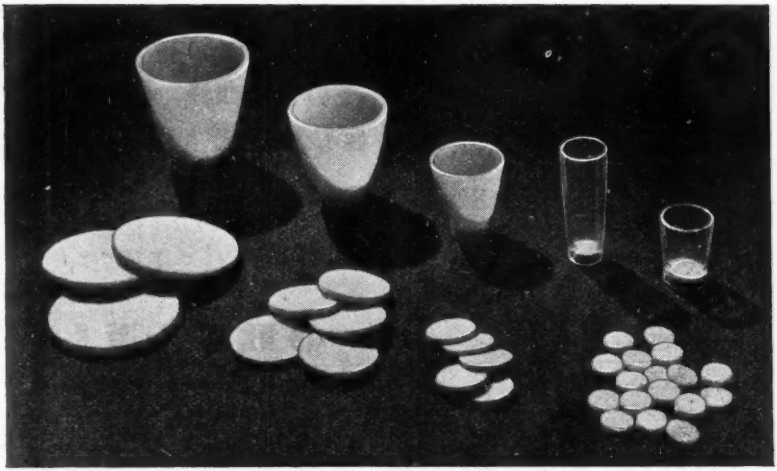

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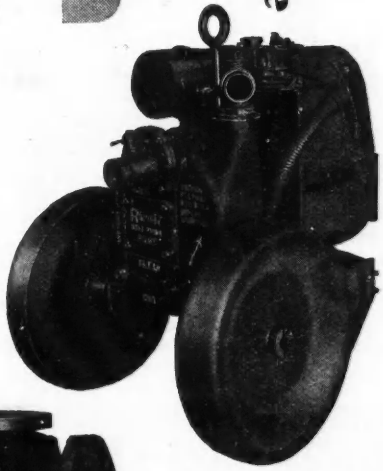

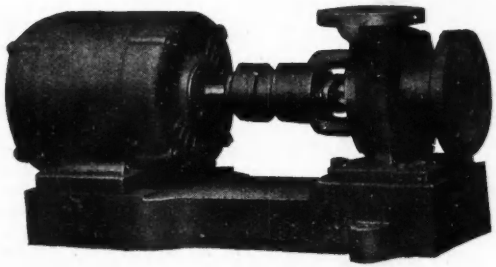

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Practical Miracles

THE wonder which is aroused—almost automatically as occasions for it become more frequent—by the achievements of contemporary science disguises some evident facts of which the cynics have long been aware. We can, it appears, excite the motion of an electron in a closed circuit so that it travels round an 8 in. diameter track in 1/200 of a second, and scientists have at hand the means of playing fast and loose with natural laws in even more spectacular ways. It is undeniably impressive, but the impatient can hardly be blamed for asking "When will the rabbit come out of the hat?" It is a plain protein rabbit, or its equivalent, they are seeking, and no accumulation of academic wonders will divert their attention. More and more are they prone to ask "How long before scientists apply to certain hoary, mundane problems more of that innovating spirit which has wrought such wonders in other fields?"

An officially-sponsored publication lately called attention to the fact that the population of Britain was about 1½ millions at the time when William the Conqueror invaded. The publication goes on to show that the rise was very slow indeed and the total of about 5½ millions remained more or less constant until the coming of industry gave Britain the power to buy her food from all parts of the known world. Now Britain and the rest of the world can draw sustenance from the uttermost ends of the earth, so that food is the subject of competition which hardly existed in those carefree days when our population was increasing from 5½ millions to nearly 50 millions. During the period of population growth in this country, British explorers were opening the world, and those who stayed at home gleaned the benefits.

But amid this seeming luxury, there were some who raised their voices in words of caution. Coal, we were told in Victorian times by a few far-sighted men, was not inexhaustible; this, at a time when coal was more a nuisance than a precious commodity, aroused the laughter of their fellows. Now we can already see a real prospect that our coal reserves in this country will be exhausted within a century or two. The oil industry brought the internal combustion engine which has annihilated distance so that we were enabled to draw the earth's fruits from all countries. We were unprepared, however, for a growing shortage of oil. The shortage is not yet absolute, but America is beginning to feel the pinch and a time must come when we shall have no more oil. The same may well be true of minerals and metals. Only by our inventive power, by the power of scientific research, can we continue to live under bearable conditions when that time comes. We shall do well to concentrate upon a more practical application of the sciences.

Among the shortages foretold by the Victorians was that of food. Malthus, who maintained that the world could never support the rapidly-rising population, was regarded not only as a crank but as immoral, because of the impact of his thesis

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on current religious thought. We might interfere with Nature in the vegetable and lower animal kingdoms, but not in the human animal. Crookes and other scientists foresaw the same problems coming upon us fast, but they were confounded by the work of other scientists, and the scoffers won the day. Fertilisers and the opening of the great American wheatlands provided ample food, though many still did not get enough. Only in the wheatlands themselves and in the highly civilised countries was there abundance.

It has been one of the tragedies of mankind that science has not kept pace with development. The science of agriculture has lagged behind, largely because the practical men who farmed the rich lands of the world would not listen. The result has been that one-quarter of the land that fed our grandfathers in America is now so badly damaged through soil erosion and other factors that it is no longer good farming land. Soil erosion is one of the most grisly problems of all, but it is very doubtful whether the world is facing it with anything like the seriousness that it demands.

The war has diminished the output of agriculture; but, taking the world as a whole, it has not diminished it to anything like the extent that shortages of most of the satisfying foods in Britain would suggest. The war has raised the standard of living of multitudes and we have no longer the means to draw upon the whole earth to feed us. Moreover, the population of the world is increasing by 20 millions annually. Sir John Boyd Orr, who is retiring from the post of Director-General of the Food and Agriculture Organisation of the United Nations has said this: "The whole human race is rumbling on to destruction. There is only a 50-50 chance of getting over the food problem. If it is not solved there will be chaos in the world in the next 50 years."

Our voyages of modern discovery must, it seems, be directed towards the scientific control of nature. Scientific agriculture must produce the maximum of food without spoiling the land. The scientist will understandably reject to the last the onus of promoting race limitation, to ensure that there shall not be more people than the earth will support in comfort. But he cannot honourably withhold anything that will enable scientific husbandry to stave off famine.

We are learning in Britain that unless we can import huge quantities of foodstuffs and raw material the islands cannot support nearly 50 million people. There seems to be a limit to how much we can export. We are working harder and harder just to keep ourselves alive—with U.S. aid. Only by using every device of mechanisation can we preserve for ourselves a reasonable standard of living, and then only if we employ to the utmost resources of science.

NOTES AND COMMENTS

Export Rewards

NOTWITHSTANDING the persistence of an adverse balance of trade between this country and the rest of the world—happily reduced last month by £12.8 million to £40.4 million—the official record of overseas trading in May contains a chain of evidence that the great efforts to which most industries have lately contributed in earnest are producing heartening results. It has been said, too, with some justification that the increase in the export total for May of £3.5 million to £129.9 million, using April's good returns as the basis of comparison, can be attributed in part to a livelier recognition by the Government of the need for realistic collaboration with the people upon whom all exports ultimately depend. However the credit should be apportioned, the result achieved in a month including the Whitsun holiday will restore faith in the final outcome of a full national endeavour, one in which chemical industry distinguished itself last month. The total of £6.985 million accruing from the sale of all classes of chemicals was £1.87 million higher than the corresponding figure a year ago, and £1.16 million more was derived from chemicals outside the drugs and dyestuffs industries. Perhaps the most encouraging feature is the evidence that this expansion is almost world-wide, excluding only the unsettled markets of India and the Far East.

British Standard Journals?

NO want of respect for the current conference on scientific information, which the Royal Society is holding in London this week, is implied by saying that the physical representation of some subjects under consideration is not impressive. Means of promoting the interchange of scientific knowledge are admittedly seldom spectacular, as the exhibition at the society's Burlington House headquarters makes abundantly evident. That is no doubt the reason for the attention that has been paid to the technical and scientific journals, some of which are at least colourful. As the primary objective of all such journals is to make new knowledge widely available the conference is entitled to take a quasi-proprietorial interest in them, but the exhibition of front covers of current journals, together with the three standard formats to which it is apparently suggested all should conform, implies a taste for regimentation no ordinary proprietor would be so bold—or so rash—as to accept. If the recommendations were followed dozens of journals in this wide field of uncertain boundaries would be squeezed into one or other of these moulds, 9 in. by 6¼ in., 10 in. by 7 in. or 11¼ in. by 8 in. Those suggestions are presumably to facilitate the duties of librarians, who are entitled to all help that can be given them, short of distorting the character of the material of which they are only one of the users. Packaging experts no doubt could present almost as cogent an argument for square eggs. A much more practical contribution was the exhibition of the Vari-typer, a relatively new, multi-language typewriter, which in addition to performing the normal functions of a typewriter, automatically adjusts the spacing to produce a regular right-hand margin, and reproduces any language, not excluding Chinese, by means of interchangeable platens.

Natural Selection

THE shape and size in which scientific publications should appear are, however, relatively of subsidiary importance contrasted with the much more sweeping proposals which have found some sponsors at the Royal Society Scientific Information Conference. These, briefly, would subject scientific publications intended for publication to a process of "screening" by one or more panels of scientific "copy tasters." Our own repugnance for any such scheme for spoon-feeding of readers of scientific writing ("Notes and Comments," May 22) seems to have been shared by many at the conference, and the general grounds for it are effectively represented in a letter from Dr. John R. Baker and Prof. A. G. Tansley in *The Times* on Monday, representing the views of the Society for Freedom in Science. They, in common with thousands of others, are convinced that to replace existing methods by the decision of a single board, which could block the publication of any paper, "would be little short of disaster." Sir Edward Appleton's comments in the course

of the opening session to the spate of scientific publications, the difficulty of keeping abreast with events and the need to protect the scientific user from "indigestion" are thought by some to reinforce the case for a scientific censorship. The DSIR secretary, who is himself indirectly one of the foremost publishers of scientific literature, is unlikely ever to be found supporting anything which would ultimately restrict the right to publish. Since the rising tide of knowledge is not to be stemmed, or invoked, at will, the law of natural selection, highly developed in all scientists who know what they are pursuing, is infintely preferable to something which suggests an intellectual equivalent of artificial insemination.

Swiss Dyestuffs Research

THE intensification of the demand for dyestuffs, evidenced here lately by the conferences called to allocate home supplies over a field rather larger than they can adequately cover, has certainly not passed unnoticed in other of the world's centres of dyestuffs production. Switzerland, for so long a leader in this field, is evidently not willing or likely to relinquish her lead, which the recent donation of an institute of dyestuffs chemistry to Basle University may well enhance. This represents in effect a pledge to future advance in the fundamental fields surrounding dyestuffs chemistry given by the two celebrated Swiss firms best qualified to benefit from whatever research can offer, Ciba, A.G. and Sandoz, A.G. The focal point of the institute is the group of seven laboratories, including the private laboratory of the principal, Prof. R. Wizinger, head of the department of synthetic organic dyestuff at Basle University, and is situated very appropriately near where a silk dyer in 1613 strengthened the foundations of a great tradition, to which his successors, a firm of dyers, added renown. Here the laboratory chief has been given the stimulating task of training a new generation of dyestuffs chemists, represented at the outset by 19 students working for their doctors' theses—the number of such has lately tended to diminish in Switzerland—and to guide investigation in fundamental problems. Investigations of the relation between chemical constitution and colour, the nature of organic metal complexes and of further aspects of the theory of valency will be among their objectives. The most modern laboratory of its kind on the Continent, the Basle Institute, may one day make history for the Swiss industry—and perhaps stimulate emulative action here.

Auer von Welsbach

AUSTRIAN scientists are preparing to celebrate on September 1 the ninetieth anniversary of the birth of the most eminent of Austrian chemical scientists and inventors, Auer von Welsbach. He died 19 years ago. Welsbach's outstanding achievement was the discovery of the elements neodymium, praseodymium and aldebarium—which we now call lutecium. From his physical work came the fructification of spectroscopy, and perhaps the most widely used and versatile of contemporary means of identification, his outstanding industrial legacies to manufacturing industry include the incandescent light (Welsbach burner), the metallic filament lamp resulting from his invention of the osmium lamp, and, last but not least, the cerium and cerium flints which are now the fundaments of the petrol lighter industry. The incandescent gas-light kept the gas industry prosperous in a rather critical time and raised it to the present high standard. His special research was devoted to the rare earth metals which he introduced to industry. He founded in 1907 the Treibacher Chemische Werke, Treibach, Carinthia, the leading firm for rare earth metals, their alloys and compounds as well as for radioactive substances. Brazil, India and other countries thus found a market for their special ores, such as monazite sand. Awarded to him were many honorary titles and honorary membership of international academies of science, and his native Vienna honoured his memory with a worthy monument in a square of the University quarter. Infinitely more enduring, however, is the memorial which his own brain wrought, spreading light, literally and figuratively, across the world.

Soviet Orders British Plant.—Orders for steel-bending and levelling machinery worth £300,000 have been placed by the Russian Government with the Wolverhampton firm of Joshua Bigwood & Son, Ltd. The contract will keep 250 men busy for more than two years.

CHEMICAL EXPORTS STILL RISING

Over £3½ Million of Coal Sold in May

THE Trade and Navigation Accounts (HMSO, 4s. 6d.) show that in May the value of chemical exports, exclusive of drugs, paints and dyestuffs, totalled £3,876,628, which compares favourably with the April figures (£3,862,371) and those for May 1947 (£2,711,934), March and February, 1948 (£3,695,151 and £3,300,041).

Increased export tonnages were registered in most chemicals during May, particularly in tar oil, creosote, etc. (3,552,340 gal. a year ago) rising to 4,597,170 gal. Cresylic acid at 263,764 gal. (210,443), and disinfectants, etc., at 68,040 gal. (49,930) also compared well. Among the markedly few commodities of which smaller quantities were exported during May this year than last year, benzol at 4382 gal. (5311), nickel salts at 2515 cwt. (6118), sodium sulphate at 14,153 cwt. (37,900), and tin oxide at 440 cwt. (789) were outstanding.

Chemical imports—£2,648,461—advanced from £2,504,756 in April, and £2,479,573 in May 1947, despite very considerable tonnage decreases in the majority of chemicals. The few chemicals responsible for the higher total value included acetic acid at 28,553 cwt. (13,054) and potassium chloride at 1,001,926 (455,405).

A particularly satisfying feature of the export returns was the figure for coal, 966,835 tons (£3,586,219) shipped mainly to Sweden, Eire and Italy) compared with 71,141 tons in May, 1947.

Scottish Mineral Survey.—The Scottish Council (Development and Industry) is to launch a survey of the mineral resources of Scotland, in association with the Council's research committee's investigation of the prospects of development of chemical and kindred industries.

CHEMICAL EXPORTS IN MAY

	May 1948	May 1947
	Cwt.	Cwt.
Formic acid	1,844	2,175
Tartaric acid	950	168
	Tons	Tons
Aluminium oxide	1,052	487
Sulphate of alumina	1,678	2,429
Ammonium sulphate	12,756	13,258
Ammonium nitrate	6,146	766
	Cwt.	Cwt.
Bleaching powder	19,828	22,712
Calcium carbide	6,686	1,856
	Gal.	Gal.
Benzol	4,382	5,311
Cresylic acid	263,764	210,443
Tar oil, creosote, anthracene oil, etc.	4,597,170	3,552,340
	Cwt.	Cwt.
Naphthalene	3,448	784
Nitrocellulose	3,405	636
Disinfectants, insecticides, weed-killers, etc.	68,040	49,930
	Tons	Tons
Copper sulphate	1,872	548
	Cwt.	Cwt.
Glycerine	257	67
Nickel salts	2,515	6,118
Lead acetate, litharge, red lead, etc.	13,413	5,322
	Tons	Tons
Magnesium compounds	1,139	825
	Cwt.	Cwt.
Potassium compounds	7,567	5,468
	Tons	Tons
Salt	18,651	10,276
	Cwt.	Cwt.
Sodium carbonate, soda ash, etc.	328,509	263,124
Caustic soda	207,875	96,652
Synthetic sodium nitrate	—	1,095
Sodium silicate	14,680	5,148
Sodium sulphate	14,153	37,900
Tin oxide	440	789
	Tons	Tons
Zinc oxide	1,156	1,207
Total value of chemical manufactures, excluding drugs and dyestuffs	£3,876,628	£2,711,934
Quinine and quinine salts	Oz. 82,391	Oz. 62,392
	Mega units	Mega units
Penicillin	349,252	130,235
	100 International units	100 International units
Insulin	828,355	356,301
	Lb.	Lb.
Acetyl-salicylic acid	129,882	70,237
Total value of drugs, medicines and preparations	£1,265,840	£1,180,326
Total value of dyes and dyestuffs	£654,816	£560,039
	Cwt.	Cwt.
Chemical glassware	1,670	1 076
Value	£53,649	£38,508
	Tons	Tons
Furnace plant	405	339
Value	£74,574	£60,429
Coal	966,835	71,141
Value	£3,586,219	£152,058

CHEMICAL IMPORTS IN MAY

	Cwt.	Cwt.
Acetic acid	28,553	13,054
Boric acid	7,460	8,800
Tartaric acid	—	—
Borax	7,040	15,984
Bromine and bromides	400	184
Calcium carbide	3,044	24,554
Coal-tar products (excluding benzol and cresylic acid)	8,485	1,503
	Tons	Tons
Ammonium phosphate	—	8
Manufactured fertilisers (including superphosphates of lime, bone-meal, etc.)	711	9,977
	Cwt.	Cwt.
Potassium chloride	1,001,926	455,405
Potassium sulphate	18,880	25,196
Other potassium compounds	1,220	2,698
Sodium nitrate	—	—
Carbon black	48,078	44,598
Total value of chemicals, drugs, dyes and colours	£2,648,461	£2,479,573

FRENCH DYESTUFFS REORGANISATION

Reversion to Independent Units Expected

IMPORTANT changes are stated to be impending in the French dyestuffs industry.

During the German occupation of France, the I.G. Farbenindustrie succeeded in compelling the leading French dyemaking firms to form a dyestuffs trust, the control of which was in the hands of the German corporation. This scheme was put into effect by the formation of the S.A. des Matières Colorantes et Produits Chimiques Francolor, to which the three leading independent French dyestuff producers, the Etablissements Kuhlmann, the S.A. des Matières Colorantes et Produits Chimiques de Saint-Denis and the Société Française des Matières Colorantes et Produits Chimiques du Sud-Est (formerly Saint Clair-du-Rhône), had to transfer their works, in return for a Fr. 800 million shareholding in the new Francolor company.

Control by I.G. Farben

The three companies were, however, forced to transfer 51 per cent of the Francolor share capital to the I.G. Farbenindustrie, which made "payment" in its own shares. By this transaction, full details of which had been made public during the trial of the leading directors of the I.G., Germany gained full control over the French dyestuff industry.

After the liberation of France, the German 51 per cent majority holding in Francolor was sequestrated by the French authorities, who appointed a temporary administrator in charge of the company's operations. This temporary arrangement, which has lasted for over four years, is stated to have had serious repercussions on the activities of the French dyestuff industry. For instance, the three French companies which had been forced by the Germans to dispose of their plant, are still completely debarred from having access to the books, etc., of Francolor. This state of affairs has necessarily led to a considerable decline in the competitive strength of the French dyestuff industry and attempts have been made for some time to put the industry on a sounder basis.

Return to Private Owners

About a year ago, a Bill was drafted by the French Socialists which envisaged the transfer of the German shareholding to the French State, while the three French companies were to have been offered tax concessions as a compensation for the losses inflicted by the Germans. It is characteristic of the general abandonment of the policy of nationalisation that a Committee of the French National Assembly recently pronounced itself against acceptance of this Bill; it is reported instead to have worked out a proposal according to which the Francolor is to be liquidated and the various works are to be returned to their former private owners. It is believed in French chemical quarters that this scheme will be carried out in the near future.

Restoration Approved

The industry's confidence about its future appears to be well-based, for the Industrial Committee of the French National Assembly has quite recently decided to support a resolution in which the Government is being asked to convene a special conference, to be attended by representatives of the Government, the Francolor, and the three leading dyestuff companies, to decide on the future of Francolor.

It is expected that the "unscrambling of the eggs" will involve the holding of an extra-ordinary meeting of Francolor at which a resolution for a voluntary liquidation will be put and adopted; this is likely to be followed by a transfer of the individual companies' I.G. shares to the French Government, which will then return their works to them. It is anticipated, however, that the Government will insist on the formation of a special organisation, the function of which will be to organise the French dyestuff industry on more efficient lines. A representative of the Government will be a member of this organisation. If this reorganisation is completed, the probability of stronger competition by the French dyestuff industry in world markets must be reckoned with.

Argentina Nearing Self-Sufficiency

Increased war production is stated to have enabled Argentina to achieve some degree of self-sufficiency in certain chemicals such as acetic acid, litharge and hydrogen peroxide whose output at the present time is said to be sufficient to supply almost all the domestic demand. Other chemicals produced before the war whose output has increased sufficiently partially to meet domestic requirements include caustic soda and ammonia and its compounds. Similar improvements have been made in the manufacture of calcium carbide, citric acid, lithopone, arsenic, and barium compounds, production of which began during the war.

SAFEGUARDING THE EXPORTER

New Bill Provides Wider Insurance Cover

THE introduction in the House of Commons last week of the Export Guarantees Bill has been welcomed by British exporters. The new measure, which proposes to amend the Export Guarantees Acts of 1939 and 1945 by increasing the maximum financial limits of Board of Trade guarantees under those Acts from £200 million to £300 million clearly indicates the growing demands of traders to avail themselves of the monetary safeguards offered by the Board of Trade in respect of foreign transactions.

In the financial year 1945-6 the amounts covered by these "insurance policies" totalled £72 million. Last year they increased to £186 million and the new Bill obviously anticipates an even sharper rise during the next 12 months by allotting a further £100 million.

Variety of Risks

The insurances, administered by the Export Credits Guarantee Department, BoT, are offered to exporters in return for agreed premiums and afford protection against the main risks of overseas trading.

The most widely used method, the ECGD (Contracts) Policy, covers, among other things, losses due to the insolvency or default of foreign buyers; sudden changes in currency exchange regulations; war or civil disturbances in the buyer's country; cancellation or non-renewal of export licences or the imposition of restrictions upon the export of goods not previously subject to licence and, in general, any losses incurred through circumstances occurring outside the U.K. and over which both buyer and seller have no control.

In respect of insolvency or protracted default in payment, the policy secures up to 85 per cent of the contract price but for other risks 90 per cent is offered. Should subsequent amounts be recovered from the buyer in respect of trade debts, 85 per cent is claimed by the ECG Department and the exporter receives the remainder, this apportionment being based on the risks covered by the respective parties.

Average Premiums

Provided the business offered is reasonable and not merely a single transaction amounting to one shipment to an individual market, the whole of the exporter's trade can be covered or insurance can be effected for certain countries only, omitting those markets where the seller is prepared to accept the trading risks himself.

If the exporter does not wish to cover risk of loss prior to shipment, but only during transit, he can avail himself of the Shipments Policy, the premiums for which are naturally less than those incurred in the full contracts policy.

Premiums vary according to the different countries and risks involved and may range from 5 to 40 shillings per £100 of turnover, but if the transaction is a fairly substantial one the premium averages about £1 per £100 of turnover.

Services Abroad

In addition to the protection of shipments, insurance can also be effected in respect of works or services executed outside the U.K., including the provision of labour and materials, provided these services are essential ones incurred by exporters in the development of their foreign trade. Sales of raw materials and primary products obtained from one foreign country for shipment to another, without coming to the U.K., can also be dealt with under special insurance schemes.

All insurances are based upon the standard contracts policy, but policies are also framed to meet individual requirements.

Fortnight's Paid Holiday

The National Arbitration Tribunal has awarded an extra week's holiday with pay, making a fortnight annually, to certain workers employed by members of the Association of Chemical and Allied Employers. The award takes effect from 1949. The workers to benefit are members of trade unions constituting the workers side of the Chemical and Allied Industries Joint Industrial Council.

Unilever and Czechoslovakia

Lever Bros. and Unilever, Ltd., and the Government of Czechoslovakia have entered into an agreement whereby the former acts as agent for the latter in the purchase of certain oils and fats. The British company will also advise on prices and sources of supply. Unilever will be paid a buying commission and will receive certain additional payments in Czech currency.

Society of Chemical Industry

Programme for Edinburgh Meeting

THE 67th annual meeting of the Society of Chemical Industry takes place this year at Edinburgh from Monday, July 12—Saturday, July 17.

After a reception on the opening day by the chairman of the Edinburgh and East of Scotland section, the main business will begin on Tuesday, with a meeting of the council, to be followed by the annual general meeting. Mr. A. H. A. Murray, Lord Provost of Edinburgh, and Prof. S. A. Smith, acting principal of Edinburgh University, will welcome members to the conference.

The Messel Medal

Activities on Wednesday include the presentation of the Messel Medal to Sir John Anderson and lectures by Prof. S. J. Watson on "Chemistry and Agriculture" and Alexander Ameil on "Refining and Hardening of Vegetable Oils."

The following day, Sir Robert Robinson will deliver the Lister Memorial lecture, "The Device of Imitation of Molecules in the Biological Field"; Dr. S. F. Birch will speak on the preparation and production of hydrocarbons in connection with Scottish shale oils.

Works Visits

Friday's proceedings include papers by Prof. H. W. Melville, "The Chemical Aspects of Elastomers"; Dr. I. A. Preece, "Two Problems in Brewing Science" and a review of organic chemical manufacture at Grangemouth contributed by Wm. Smith and W. G. Reid.

In addition to the more serious business of the conference an extensive social programme has been arranged and members will have frequent opportunities to visit various works in the neighbourhood including those of T. & H. Smith, Ltd., manufacturing chemists; Edinburgh and Leith Flint Glass Works; Scottish Oils, Ltd., Pumpherston; I.C.I., Ltd., Grangemouth; North British Rubber Co., Ltd., and the Balfour Group of Companies, Levin, Fife, makers of chemical plant. On Friday delegates can also inspect the chemical laboratories of the University of Edinburgh.

The final day will be devoted to a motor coach excursion to the Perthshire Highlands.

Glue, Gelatine and Size.—The Board of Trade announces that no applications are necessary from existing licence holders in respect of new licences to acquire, consume and supply glue, gelatine and size during the July-September quarter. The licences will be posted before June 30.

Steel Industry's Offer

Pig Iron Costs to Rise

THE Minister of Supply has made the Control of Iron and Steel (No. 64) Order, which came into operation on June 21, increasing the maximum price of pig iron (other than common foundry iron) and finished steel.

The purpose is to give effect to an offer by the British Iron and Steel Federation, made in response to the Chancellor of the Exchequer's special appeal to industry, to absorb part of the abnormally high freight cost on imported ore previously paid from public funds. The industry's contribution will amount to about £2,250,000 a year. This arrangement itself involves no increases in the price of finished steel but only in basic and hematite pig iron, cylinder and refined iron, and semi-finished steel. At the same time, minor increases are made on various other grounds in the maximum prices of some products. The freight subsidy will now require about £7 million annually from public funds.

As an immediate result of the order, the Ministry has issued details of several new schedules detailing a number of price increases for certain grades of iron and iron products. Basic pig iron will cost 4s. per ton more, the hermatite grade 6s. more and there will be smaller changes in the prices of alloy, stainless and shell steels.

CEMENT SHORTAGE

LIVERPOOL builders have asked the Minister of Works, Minister of Health and the President of the Board of Trade to divert cement supplies from export to prevent further hold-up in the home building programme and increases in unemployment among building trade operatives. The demand is in a resolution passed by the Liverpool Regional Federation of Building Trade Employers, stating that the "Federation is gravely concerned about the very serious shortage of cement for building work and strongly urges that the present export figures should be reduced and more supplies made available for the home market immediately. The present scarcity of cement is causing dislocation in the building industry, unemployment among operatives, and unless the position is remedied at once, this federation is of the opinion that serious and lasting damage will be caused to the well-being of the industry." Mr. H. Langford, secretary of the federation, said on June 17 that cement was now scarcer than it was after the fuel crisis of last year. "About 50 per cent more cement is being exported to-day than in 1938," he said.

SCIENTIFIC INFORMATION

500 Delegates Reviewing Distribution Methods

THE good wishes of Sir Robert Robinson, president of the Royal Society, Sir Edward Appleton, Sir Henry Tizard and Mr. Herbert Morrison were conveyed in introductory speeches which marked the initiation on Monday at the Royal Institution of the most widely supported attempt to review and improve some existing methods of distributing scientific information.

The scientific information conference, which will continue for a fortnight, until July 2, is the outcome of recommendations of the 1946 Royal Society Empire Scientific Conference and the British Commonwealth conference on the same subject that year. It has attracted to London more than 500 scientists, many of them from overseas, including a delegation from the UNESCO headquarters.

Among the 26 U.K. organisations sending delegates are: The Chemical Society, Chemical Council, Biochemical Society, FBI, Faraday Society, and the British Standards Institution.

The 34 papers accepted for submission include: the conference lecture, "The Presentation of Scientific Information," by Prof. E. N. da C. Andrade; "Provisional Scheme for Central Distribution of Scientific Publications," by Prof. J. D. Bernal; "Optimum Format for Scientific Journals," by M. D. Vernon; "Make-up of Periodicals," by ASLIB, and many authoritative studies of abstracting and reproduction.

Aims of the Conference

Sir Robert Robinson, opening the conference, said it would be the purpose of the gathering to discuss and recommend to the Council of the Royal Society any ways in which the present systems of publishing original scientific work, the abstracting of it and the indexing of it for future reference can be improved. The conference would concern itself only with scientific information services in the English language. He welcomed the overseas delegates from the British Commonwealth and emphasised the importance of speedy communication of new scientific knowledge within the Empire.

Sir Edward Appleton, secretary of the DSIR, said: "In spite of everything we manage to do to foster the movement of scientists, and to effect personal contacts between them, we have to admit that they live chiefly on the printed word. After all, it is often by the medium of publication that a scientific worker may be helped—and indeed often inspired—by a fellow worker whom he may never have seen and who lives thousands of miles away.

"Science has been well served in the past by the publications of its learned societies and academies and by the scientific journals. But the spate of scientific publications is now such that it is becoming extremely difficult to keep abreast with events on even the most limited sector of the scientific frontier."

The really important objectives of the conference, he said, were three-fold. First, to ensure that the scientist gets all he needs; secondly, that he gets it quickly; and, thirdly, that he gets it in the right form and shape. Any solution they recommended must, however, be practicable. It must be reasonable in cost and it must take into account the acute shortage of scientific manpower which is hampering the development of almost every scientific organisation in the world.

It seemed to him that they would reach satisfactory solutions of the problems before them only if they kept constantly in mind the needs of the scientific user. They had to protect him from indigestion as well as to give him the sustenance he needed.

"I realise, of course, that I have only mentioned a few of the problems which are before you. All users of scientific information recognise their difficulty; but if you solve them you will have rendered the greatest possible service to science."

A comprehensive programme for the conference delegates includes excursions to Government and commercial establishments to see aspects of distribution of scientific information. Such a visit will be paid to I.C.I., Ltd. (Nobel House), to see the "master index."

U.S. HOLDING SOLD

UNITED Molasses Co., Ltd., which in January, 1947, acquired 50 per cent of the issued capital of a well established flour, cattle and poultry food mill on the U.S. Pacific coast, has sold its interest at a 40 per cent capital profit—£121,000. In a statement to stockholders last week, Sir F. Michael K. Kielberg, the chairman, said recent and unexpected developments beyond their control caused them to accept a bid to sell.

German Uses of Ultrasonics

Original Experiments in Spinning and Metal Bonding

A SCRUTINY of BIOS Report No. 1504, "Industrial Applications of Ultrasonics," reveals that the possible uses of ultrasonic vibrations in industry appear to have received comparatively little attention in Germany and, in common with Britain and other countries, there is a scarcity of published material on the subject.

The term "ultrasonic" is defined in the report as "the use of higher frequencies than those in the audible range."

Three Methods

German development work is based chiefly on the production of ultrasonic vibrations by three methods. An acoustical mechanical device derived from the Galton whistle, magneto-strictive generators and Piezo-electric generators.

The magnetic-strictive generator utilises the principle that magnetic metals are able to change their dimensions in the direction of an applied magnetic field, and if an alternating current is superimposed on a constant and direct current, and the resultant combined electro-magnetic field allowed to act on a nickel rod, the rod will oscillate and emit ultrasonic vibrations of a frequency dependent on that of the alternating current. The report gives details of a circuit based on this principle together with a description of the working of the system.

The Germans used only quartz crystals in their Piezo-electric generators and the report describes the method of operation with the aid of diagrams. The mechanical generators, based on the Galton whistle, use a liquid instead of a gas for the production of the ultrasonic vibrations.

Few Concrete Results

Although there were a number of industrial ultrasonic applications patented in Germany, none of them was apparently used on a large scale. Siemens patented a process for spinning artificial fibres but it does not appear to have reached the production stage. Two processes were envisaged, the more important one being based on the principle that if ultrasonic vibrations are passed through a spinning solution in the direction of the spinnerette, an alternatively thick and thin fibre would be obtained by the alternate compression and rarefaction of the solution at the nozzle. It was also proposed to study the mechanism of emulsion formation using magneto-strictive oscillators and the results obtained suggested that emulsification was produced by cavitation effects.

More positive results were obtained in the field of water purification but other methods were found to be more effective in their destructive effect on undesirable organisms and the ultrasonic work was not proceeded with. A specially interesting application of ultrasonics, which may be considerably developed in this country within the next few years, is in the sphere of smoke prevention through the coagulation of smoke particles.

Siemens also discovered that if molten solder, in contact with metal, is subjected to ultrasonic vibrations, a satisfactory joint can be obtained without the use of a flux. This may afford a considerable advantage where the soldering of aluminium is concerned, a difficult matter under normal conditions owing to the readiness with which this metal oxidises. The high frequency vibrations break up the oxide layer and expose the pure metal to the solder. Crystallisation was found to be accelerated by the effect of ultrasonics, but the German work in this field was still incomplete.

CHEMISTS AND NHS

THE National Pharmaceutical Union stated this week that most dispensing chemists would accept service under the National Health Act and there should be no difficulty in satisfying the many demands which might result from the new conditions. The statement added that the Ministry's final offer gave chemists considerably greater advantages than they at present received for dispensing national health insurance prescriptions and compared favourably with the payments for private dispensing.

Gas Bill: Third Reading.—By a vote of 340-190 the Gas Bill received its third reading on Wednesday last week. Describing the Bill as "rotten to the core," Mr. Brendan Bracken said it not only inflicted grievous injury on the gas industry but on other industries to. It would increase costs of living and add to the difficulties experienced by British goods in overseas markets. In his defence of the Bill, Mr. H. T. Gaitskell said it was a good sound piece of Socialist legislation. He had never been able to understand the ground for opposition to compensation on the basis of stock exchange values.

THE PLANNING FUNCTION IN CHEMICAL ENGINEERING

Merits of a Continuous Record of Progress

by A. J. SPEAKMAN

THE problem of devising a practical planning system for chemical engineering work is probably the most difficult to be encountered in the entire field of industrial practice. This arises out of the fact that each plant has to be built round a particular process and, even with similar processes, variations in the outputs required make the plants dissimilar in size.

Every project has, therefore, to be considered on an individual basis yet, at the same time, it is essential that the work involved in all projects should be related on a common basis if the engineering commitments are to be viewed as a coherent whole.

Again, the difficulties encountered are unlike those to be met in the accepted sense of production planning in that a considerable amount of highly technical consideration has to be given from receipt of the original inquiry to submission of the final tender. In the initial instance, the chemical engineer has to sell his potential customer an idea—a way of doing something.

Before Production Starts

Though the actual manufacturing details are of secondary importance at this stage, it does indicate that planning, as such, must cover two major requirements.

The first involves planning the pre-production sequences from inquiry to tendering stages and the second, production planning from receipt of the order to final erection of the plant.

While the second requirement lends itself to orthodox methods of approach, the first requirement presents several inherent difficulties, chiefly because mental processes are involved which, because they are intangible, cannot be assessed in terms of the time required to elucidate a particular problem.

Nevertheless, any concern which ignored the necessity of planning the work of its technical staff would be unable to hold its own in a competitive market where early submission of a tender can influence the placing of an order. Moreover, it is a condition of personal efficiency that technical officers should set themselves individual targets which serve in the build-up of the overall plan of technical activities.

The system considered here recognises the fact that capital expenditure on adequate facilities can be recovered only through process operations and, whether those "facilities" are expressed in terms of machines or people, it is a fundamental principle of planning which must hold good.

The fact that many systems of planning prove imperfect in operation is not because our conception of planning is wrong, but because, in the majority of cases, those who have had to apply such systems have not always in the first instance worked out what were the basic requirements. It is not sufficient to indicate what is taking place in each department. The main essential is to know what should be taking place and to be able to relate the performance to the programme.

Burdens on Capital

The protracted delivery position regarding raw materials and component parts makes it a simple matter, for a firm whose order book is full, to find itself in danger of insolvency through over-trading. Accounts rendered by suppliers have to be met, usually within one month following delivery of material.

On the other hand, many months may elapse before component parts in the form of fittings are to hand; which means, in effect, that the firm is committed for the bulk of the material costs long before the plant can be erected and the account rendered.

The size of this gap between expenditure and its recovery is conditioned very largely by the efficiency of the planning system in the placing of orders in correct rotation and the progressing of "bought-out" items. A healthy order-book can soon become a liability unless the relationship between planning and cost control are recognised at an early stage.

One of the main problems, as already stated, is the dissimilarity between plants yet, even so a large proportion of individual units may be common to many types of plant or may even be marketed as standard. Standard units must ordinarily be produced prior to receiving the order; for the purchaser in such instances is seldom content to wait for a long delivery.

In these circumstances, the task of production planning possesses two aspects, short-term, and long-term. The former is concerned with making current arrangements for providing materials, tools, and labour, while the latter involves prediction of future

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requirements as well as making preliminary arrangements regarding deployment of resources in accordance with this prediction.

In either event, however, the works manufacturing capacity constitutes the common denominator to production as a whole and engineering planning must be based on this fact.

Pre-Production Planning

Where it is decided to tender on an inquiry, it is of paramount importance that no unnecessary delay should occur in any of the stages of tendering and, also, that the progress of the inquiry should be under constant review by the management.

Fig. 1

In this connection, many "variables" are encountered. The client may demand a tender to be submitted at an earlier date than that indicted when the original inquiry was made, or the work position in the shops may alter, not infrequently through plant being held up in course of manufacture through shortage of component parts.

In short, the whole position is "fluid" and yet the planning engineer must be expected to co-ordinate these variable factors so that the firm can tender at fixed prices and within the limits of firm delivery dates.

Fig. 1. shows the main functions of pre-planning, all of which fall within three main groups. The first comprises consideration of the technical factors involved not only in fabrication but also in the process. This work comes within the province of the skilled chemical engineer and, on him, depends the final decision as to whether the project is feasible. If it is, he makes out a tendering report, specifying the lines to be followed in formulating the general proposals.

The report is then sent to the drawing office, where the designer reviews the job, not only from the point of view of the general arrangement drawings which are necessary for inclusion with the tender, but also, to determine the number of detail drawings which will have to be made if the firm obtains the order. Above all, he must know the time required to do those drawings; all this is going to have a direct bearing, not only on the commencement of work in the shops, but on placing of orders for raw materials, etc., by the purchasing department. They must be supplied with a schedule for this.

All this information is added to the tendering report which then passes on to the estimator who is responsible, not only for estimation of the labour required in terms of cost, but also for estimation of material deliveries and costs.

Once again, this information is added on to the tendering report which now passes on to the planning department.

So far, the tendering report indicates the actual period of time required for the specific functions of design, and material ordering. In the planning department the problem changes from one of how long will it take to one of when can it be made.

This can be decided only in the light of the work actually going through the shops, which is catered for by the production planning system described later.

Plotting Progress

At this stage, however, the planning engineer is able to co-ordinate the times required for design, material deliveries, and fabrication, the sum of which indicates the length of time between the placing of an order and its final erection.

His main problem is to know when he can load the work on to the shops, if the firm obtains the order, and this problem is common to all departments concerned in the pre-production stage.

Fig. II. shows a useful method of plotting the progress of inquiries through the various stages. Each inquiry carries its own little slip on the left hand side of the panel. The time scale is read off at the top and, against each inquiry, coloured symbols are plotted showing the time the inquiry has been in a particular department. Thus, if the design, estimating, and planning departments, are allotted three different colours it is possible to obtain the following information at a glance.

(1) The total number of inquiries on hand.
(2) Which department is dealing with which inquiry.

(3) The "load" on any one department.
(4) The length of time any inquiry has been in any department.

As stated, the processes involved in tendering are mental rather than physical and, for this reason alone, they cannot be planned in the same way as fabrication in the shops. At the same time, target dates for the completion of departmental work can be indicated, and, likewise, priorities between individual inquiries can be shown.

Being of a "unit" construction, the panel shown in Fig. II. serves a useful purpose in this connection as any variety of combinations can be worked out. Not only does the panel co-ordinate the functions of other departments, but the job can be broken down so that each department has its own panel carrying identical information to that shown in the planning office.

Production Planning

It is not sufficient to show what is happening; the technique of planning is to ensure that events happen at the right time, or, if they do not, to show how much behind time they are.

The planning department must achieve two main objects if it is to function efficiently. First, it must provide management with information concerning forward commitments so that the factory is not overloaded with work which cannot be completed on time and also so that measures can be taken to sub-contract work where overload is revealed, or additional work can be accepted where capacity is not fully utilised. Second, it must be so devised that it serves to bring men, machines, and materials together at the right time.

The first step towards the achievement of these objects is to present a clear statement of the number of orders, together with the manufacturing time in the various shops for each order. The planning panel is particularly useful in this connection and can be used in a somewhat similar manner as for recording inquiries. The left hand side of the panel carries strips indicating the name of client, brief description of job, and office order number on each strip. The top edge of the panel is marked off in the form of a time scale.

On the body of the panel, and against the respective orders, the following information can be "plotted":

(1) Date of order.
(2) Duration of designing time.
(3) Due dates for deliveries of raw materials.
(4) Due dates for deliveries of fabricated materials.
(5) Duration of fabrication time.
(6) Duration of erection time.

It will be appreciated from the foregoing that the basis for the information plotted on the planning panel is held by other departments but that this information is co-ordinated by the planning department in the form of a master programme of work.

It is opportune, therefore, to reiterate the absolute necessity of planning in all associated departments, such as drawing office, purchasing and works offices if the plan is to function in its entirety. Thus, the drawing office should—on receipt of the order—refer to their commitment at the time they dealt with it as an inquiry and this commitment should now be added to the "load" of the office on a planning panel similar in make-up to that in the planning department, with the exception that it will show not only

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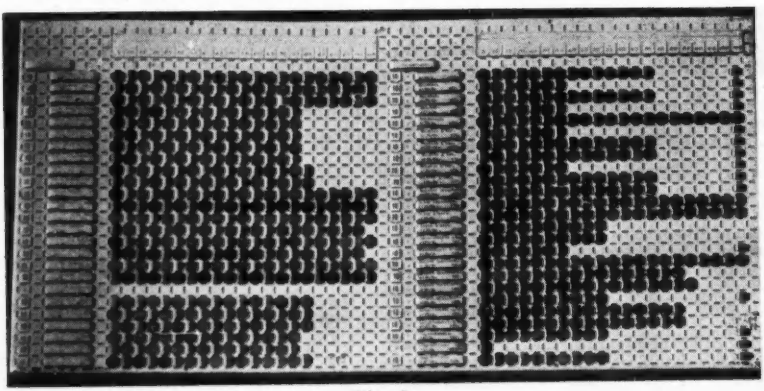

Fig. 2

the target date for completion of all drawings, but also the man-hours required for such drawings.

Up to now, only a passing reference has been made to the schedule but this is undoubtedly the most important clerical record in the whole of the planning set-up as it forms the media for supplying the following information:

(1) To Purchasing Department: Materials and components required.

(2) To Progress Department: At what stage in production such materials and components must be to hand.

(3) To Workshops: So that they may know what they have to make and can prepare accordingly.

(4) To Stores: So that they can "batch" materials and parts sufficiently far ahead to show up shortages and avoid delays in feeding the shops.

The planning department co-ordinates these pre-production factors and ascertains capacities, interpreting them in the form of a management "picture" by the use of the planning panel.

Progressing

The majority of criticisms levelled against planning systems are based on the fact that it is so long before the manufacturing departments can obtain the information they require that, by the time they do get it, it is out of date! Obviously, it is essential to be able to check both the plan and its performance and progressing is, therefore, the concomitant of planning. To have one, without the other, is meaningless yet, at the same time, if the planning system is sound the work should tend to "progress" itself throughout all stages of manufacture. Indeed, the efficiency of the system as a whole may be judged by the proportion of "chasing" to "progressing."

Progressing has three main functions to fulfil in relationship to planning:

(1) To be acquainted with all aspects of the plan and to be able to check it at every point.

(2) To remedy defects within its competency.

(3) To report to management any required remedial action.

Again, these functions can be broken down further into work in the engineering stage, purchase, and sub-contracting departments.

The progress function, however, must be viewed as a coherent whole, as the factory is concerned with the output of completed plants not parts. A good progress engineer will follow a particular project throughout all stages from design to erection, watching the movement of each item from the time the material arrives until all completed units are available for final assembly.

The Implications of Planning

While the approach to the problem is largely theoretical, the application of any planning system must be made in accordance with the information which management requires. Planning, of itself, is a way of thinking and can therefore only function within the limits set by the management of which it is the instrument.

Systems fail because the activities of a firm have far outgrown the capacity of their methods of control, which may have been devised for conditions half a century ago. Indeed, it is illogical that so much attention should be given to improvement of technical processes while ignoring improvement of methods of implementing those processes.

This state of affairs has been brought about by the extreme shortage of chemical engineers in this country and the consequent lack of any proper direction of personnel in concerns which employ both chemists and engineers, without adequate means of liaison or functional control.

SAFEGUARDS IN THE USE OF ELECTRICAL EQUIPMENT

THE British Standard Code of Practice C.P.1003, which has lately been drafted by a committee convened jointly by the Institution of Electrical Engineers and the British Standards Institution, offers guidance in the selection, installation and maintenance of flameproof and intrinsically safe electrical equipment for industries other than coal mining.

The code points out that no electrical apparatus should be installed in areas where explosive or inflammable atmospheres normally persist, and emphasises that its recommendations are only intended to apply to other areas where the risk is liable to arise or where it may arise under certain emergency conditions. A section deals with intrinsically-safe circuits and apparatus, and indicates the conditions under which these may be used and the necessary precautions which must be adopted.

Copies of C.P.1003 may be obtained from the Sales Department, British Standards Institution, 24 Victoria Street, London, S.W.1 (2s. post free).

STERILISATION BY LIQUID AEROSOLS

Distinctive Advantages over Wet Sprays

by A. E. WILLIAMS, F.C.S.

A LIQUID aerosol may be defined as a suspension of minute liquid particles in air or other gas and it is normally produced by means of compressed air in a special mechanical device. For many years the so-called "wet-spray" which delivers liquids in the form of a fine mist has been in use for various industrial purposes, and such a spray produces particles varying from 1/25 in. to 1/100 in. in diameter. These relatively large particles will easily wet any surface with which they come into contact and this fact has limited the use of the wet spray to some extent. An aerosol, on the contrary, is so finely divided that it does not wet a surface it contacts, its particles varying between 10 and 0.25 microns. Such a finely divided material can perform useful work.

The smaller the particle of liquid, the more resistant it becomes to "bursting" on contacting a surface; the kinetic energy with which a particle strikes an obstructing surface is a similar factor. This kinetic energy is equal to

$$Mv^2/2g$$

where M = the mass of the particle, v = its velocity, and g = the gravitational constant. For a given liquid, the smaller the volume of liquid within the aerosol particle compared with the surface area of the particle, the higher becomes the resistance to bursting.

The volume of a spherical particle is

$$\frac{4}{3}\pi r^3$$

where r = the radius of the particle, and the surface area of the particle is $4\pi r^2$.

Thus, the smaller the ratio $\frac{4}{3}\pi r^3/4\pi r^2$, that is $\frac{r}{3}$, the stronger the particle. From this it is clear that, for maximum resistance to bursting, the radius of the particle must be kept as small as possible. The strength of the particle is therefore proportional to $\frac{3}{r}$. At the point of bursting, the kinetic energy of the particle is proportional to the resistance to bursting, that is

$$\frac{Mv^2}{2g} = K\frac{3}{r},$$

where K is a constant for a given liquid.

The mass M of a particle is proportional to r^3, that is $M = Cr^3$, where C is a constant. Thus we have

$$\frac{Cr^3 v^2}{2g} = K\frac{3}{r}$$

Such data indicate that if a particle of a specific size can strike a surface without bursting, a particle of half the size can strike the surface at four times the speed, and a particle of one-third the size can strike at nine times the speed, without bursting. During the application of aerosols the velocity which is imparted to the particles is not sufficient to increase their kinetic energy to the point at which they burst on impact.

No Explosion Risk

There are several other differences between aerosols and wet sprays. For example, the aerosol particles possess "Brownian" movement and they are capable of prolonged suspension even in perfectly still air; they are sometimes ionised, which also tends to keep them in motion. Because of these characteristics an aerosol can permeate the whole of the air in any enclosed space within a very short time and can enter small cracks and crevices. Aerosols of some inflammable liquids (such as kerosene) are peculiarly enough entirely non-inflammable. When such liquids are used in the form of a wet spray, however, their inflammable properties are maintained. Moreover, wooden floors, etc, gradually become impregnated and thus highly combustible and a danger to the factory. The wet spray cannot normally be used in rooms containing open fires or naked lights. Tests show that it is quite impossible to ignite the aerosol itself. Although the particles of the aerosol which directly contact the flame may catch fire, the flame does not spread across the space between each individual particle.

In the brewing and the fermentation trades, the destruction or inhibition of airborne fungus spores is of great importance. The problem is somewhat different from that encountered in the destruction of bacteria, on account of the greater bulk of the fungus spore. The average bacterium has a volume of about one to two cubic microns, while the average fungus spore may have a volume of 100 to 200 cubic microns. Due to the greater bulk to be overcome a higher concentration of an aerosol is employed than

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would normally be necessary in dealing with bacteria.

Tests have been carried out on a number of types of fungus, using a Phantomyser apparatus—a self-contained unit for the rapid creation of aerosols, made by Aerosols, Ltd.—in which a liquid known as "Aeryl 1" was used. For the purpose of the tests the fungus was cultured upon 2 per cent maltose agar until a sufficient growth had been obtained. The plates were then left open in a temperature of 37°C for 16 hours to dry.

The cultures were powdered as finely as possible and divided into two equal parts. One part was distributed about the test chamber by means of a strong current of air. After an interval of 30 minutes, during which the chamber was left undisturbed, plates were exposed for 15 minutes, and these plates constituted the controls. After the chamber had been carefully cleaned, the other part of the cultures was distributed in the same way and an aerosol to a concentration of 1 : 500,000 was introduced. The chamber was again left undisturbed for 30 minutes, after which further plates were exposed for 15 minutes, these plates constituting the test pieces. They were incubated at 20°C. for 100 hours before the colonies were counted.

Good Results

There was complete lack of growth on only two of the test plates, but it should be noted that the original inoculum was very heavy and grossly in excess of any infection likely to occur in practice. In many cases it was not possible to count the colonies on the control plates, owing to these becoming a continuous mass of mycelium. In the following table, colonies in excess of 500 may also be described as "confluent growth."

EFFICIENCY OF AEROSOLS IN DESTROYING FUNGUS

Strain of Fungus	Colonies on Test Plates	Colonies on Control Plates
Cladosporium herbarum	38	Over 500
Mucor racemosus ...	4	Over 500
Thamnidium elegans ...	2	Over 500
Cladosporium herbarum (another strain) ...	24	Over 500
Wardomyces anomala ...	2	35
Penicillium commune ...	65	Over 500
Mucor adventitius ...	6	Over 500
Torula botryoides ...	None	184
Sporotrichum carnis ...	None	275
Aspergillus niger ...	8	450

The results of these tests show that, in spite of the comparatively large size of the fungus spores, it is possible to deal with them effectively by the use of aerosols of the correct liquid in sufficient concentration.

In the destruction of insect pests in factories, aerosols of insecticides do not wet, scent, flavour, or stain even the most delicate goods, when used at the necessary concentration. Tobacco, cocoa, flour and similar products may be treated without any danger of contamination. In an average type of factory one pint of a suitable insecticide in aerosol form is usually sufficient to destroy all insects in a space up to 30,000 cu. ft. This corresponds to a concentration of from 1 : 1 million to 1 : 1.5 million and is from one-tenth to one-twentieth (according to temperature, pressure and relative humidity) of the concentration necessary to produce any deposition or condensation of the insecticide. A given type of insecticide, therefore, is far more economical when used in aerosol form than if used as a wet spray, which has other disadvantages.

Because an aerosol diffuses quickly throughout the space being treated it reaches any form of life that may be concealed in cracks or crevices.

Compared with the use of fumigants, such as the highly toxic hydrogen cyanide, the use of insecticidal aerosols possesses outstanding advantages. Although one does not willingly stay for a long period in the aerosol of a kerosene or oil-based insecticide containing, for example, pyrethrum, there is no evidence to show that such an aerosol has any toxic effect upon human beings or warm-blooded animals.

Insecticides for Aerosols

Insecticides based on most of the known natural substances toxic to insects are successful as aerosols. Among the synthetic products, dichloro-diphenyl-trichloroethane (DDT) gives good results when used in aerosol form. Another synthetic material, hexachloro-cyclohexane, the gamma isomer of which is now known as Gammexane, can also be used in aerosol form. In general, these synthetic products do not give such a quick "knock-down" of insects as does, for example, pyrethrum, when used in aerosol form. There is a certain amount of "delayed action" before it becomes obvious that the insects have been destroyed, but the ultimate action is, nevertheless, efficient.

Materials in aerosol form are being increasingly applied to air sterilisation and disinfection in hospitals, laundry sorting rooms, etc.; while in commercial buildings and factories the same technique appreciably assists in reducing the spread of infection.

New Blantyre Factory.—Honeywell Brown, Ltd., the British subsidiary company of Minneapolis Honeywell of Detroit, has been allocated 30,000 sq. ft. of factory space at the Blantyre Industrial Estate, Lanarkshire. The company will manufacture electronic and mechanical process control instruments and 300 people will ultimately be employed at the new plant.

MODERN METHODS OF ANALYSIS—IV

The Polarograph, Spectrography and Absorptiometry

From a Special Correspondent

IT is possible that no single method of analysis has caused more interest and discussion than the application of the dropping mercury cathode in the instrument known as the polarograph.

When this instrument, which measures or records the diffusion current arising from the application of a variable e.m.f., was first brought to the notice of analytical chemists, in the 1930's, there was an unfortunate tendency to represent it as offering a potential solution to all the problems of analysis. Nowadays a truer understanding of the value of the instrument has been made possible by a vast amount of research, both directly in its use in the study of analytical problems, and indirectly in the investigation of the theory of the method.

It is now quite clear that, although the scope of the instrument is quite sharply limited to systems whose electrical behaviour is clearly understood, there are many cases in industrial analysis where it offers a speedy and convenient answer to problems of routine analysis.

Amperometric Titration

Stemming from polarography we have amperometric titration, which is still in the development stage. Just as in conductometric and potentiometric methods the conductance and the potential were measured, here the alteration of the diffusion current indicates the approach of the end point of many titrations. Once again we are afforded a means of determining end-points which are delineated only with difficulty or not at all by more orthodox procedures.

Before turning from electrical methods, brief mention should be made of electrography, which to some extent exists as a qualitative counterpart of recent development of electrodeposition methods. Making use of the range of modern reagents, extensions have been made of the method back to the quantitative sphere, by a measure of the colour produced when ions are transferred from a specimen into paper impregnated with a reagent.

Dielectric constant, and electrophoretic phenomena have also provided the analytical chemist with means of achieving results, although in rather limited spheres.

The wide use of the spectrograph has already been commented upon. Both emission spectra and absorption spectra have proved of value for analytical purposes, and it is possible to classify the more important fields of application broadly.

Emission spectra are measured almost entirely in the visible and the ultra-violet regions, and are applied, both qualitatively and quantitatively, to the majority of the metallic elements and to a number of the non-metallic elements. Such investigations are largely confined to the field of inorganic analysis.

Absorption spectra are of value when one turns to the organic field. Formerly the measurement of absorption spectra in the visible and the ultra-violet proved more useful as a means of confirming the structures of new compounds than as a direct analytical tool.

More recently, the extension of measurements into the infra-red region has made possible the application of spectrographic methods to the analysis of quite complex mixtures of closely related organic compounds which could otherwise be analysed only with uncertainty and with great labour.

The use of Raman spectra covers a similar field to the use of infra-red spectra, with the advantage that it permits the use of more orthodox apparatus, which suffices for visible and ultra-violet work. Quite recently, too, the lessons learned in the infra-red region have been reapplied to the ultra-violet region, so that increasing use of this region for true analytical purposes is to be found.

Absorptiometry

Recent investigations have shown that, in this country at least, the instrumental method which has found the widest application, and which is indeed by now established as an essential method, is absorptiometry. This is an extension, as has already been pointed out, of the older method of colorimetric analysis.

Making use of modern organic reagents which produce colours of high intensity with many elements, and of new methods of measuring the intensity of colour photo-electrically, thus dispensing with the observer error, absorptiometric methods have been applied to almost every phase of inorganic analysis, and to many aspects of organic analysis. Closely allied to these methods, although not so widely applicable, are nephelometric methods, depending on the measurement of the amount of turbidity produced under rigidly controlled conditions, and fluorimetry, which can be applied in those in-

(*Continued overleaf*)

300 Million Volts for Research

Health Safeguards at Glasgow University

ELABORATE precautions have been taken to ensure that the 300 million-volt X-rays produced by the 150-ton synchrotron to be established at Glasgow University for atomic research are made harmless after experiments. The synchrotron will be housed 20 ft. under ground in a new research department on which work has begun. About 20 members of the staff of the university and some 25 post-graduate students will work there.

Prof. Philip I. Dee, of the Department of Natural Philosophy, who will be in charge of the research, said at a Press conference last week, that the experiments would not be of the slightest danger to anything or anybody in the neighbourhood. "Ridiculous statements have been made about this, but long before anybody outside could be affected the people inside would be dying, like rats," he said. "As we are not going to kill ourselves—and we shall be working close to the machine—people outside have no cause to worry."

He said that the synchrotron would be in a concrete well with walls and roof 5-ft. thick, the roof being two concrete slabs electrically operated to give access to the machine.

The rays, which he believed were of the highest voltage produced in this country and perhaps anywhere in the world, would be produced as a beam. While enclosed in a concrete chamber, the beam would be used to bombard other matter. The results of these bombardments would be recorded and passed on to the research rooms. As research workers they were not specially interested in the actual working of the synchrotron, but merely in the beam it produced. The radio-active substances created during the experiments would be studied in the research rooms above the beam chamber.

"We shall study all the processes which take place," Prof. Dee said. "We are interested not only in disintegrating the atom but in the processes of scattering. We want to produce new types of particles. This is a study into new frontiers of knowledge—experimental probing into the structure of matter. While we are not indifferent to results which might benefit society, we shall not aim at any particular development. Only when new phenomena are found can they be applied to something specific."

He said that no attempt was being made to enter a world race for the largest synchrotron. The most important factor was that scientists would be able to work on the project as a team. The team would be delighted to collaborate with the medical department.

Engineers in charge of a smaller synchrotron brought to the University some weeks ago have been given small cells which measure the radioactivity to which the bearer may be exposed.

MODERN METHODS OF ANALYSIS

(*Continued from page 877*)

stances where the product of a reaction fluoresces in ultra-violet light.

Among optical methods, refractometry and the old-established polarimetry must not be forgotten. These have limited application, but in certain problems are invaluable, and should always be borne in mind as offering a possible means of tackling an analytical problem.

The mass spectrograph has been applied in recent years to analytical problems of a more general nature than the segregation of isotopes. Although at present the necessary instruments are too elaborate and expensive to permit this to be a generally applicable tool, there seems every reason to believe that its use will increase quite notably in the next few years.

X-ray analysis and the related electron diffraction analysis are also procedures which the analyst must be prepared to make use of in many cases where no form of chemical analysis will provide the answer. Thus, where the precise physical nature of a substance is in question, rather than a variable chemical composition, such methods are normally the only ones which will suffice.

It is clear, too, that in the future the analytical chemist must be prepared to make use of the vast field opened up by the large-scale production of radioactive isotopes. Hence radiometric methods of analysis, in the past of limited application, will gradually come to hold a prominent place in the modern chemists repertoire.

Thermal analysis, the use of the ultra-centrifuge, and magnetic methods of analysis are typical of a wealth of other minor methods which have had a certain application, and of whose existence the analytical chemist must certainly not be unaware, though he may have had no occasion to make use of them.

(*To be continued*)

PERSONAL

SIR ARTHUR JAMES CROFT HUDDLESTON, a director of the Royal Technical College, Glasgow, left £19,250.

DR. H. R. COX, director of the National Gas Turbine establishment, has been appointed chief scientist at the Ministry of Fuel and Power.

BRIGADIER A. LEVESLEY, O.B.E., M.C.T.D., a director of Edgar Allen & Co., Ltd., has been appointed Honorary Colonel of the 49th (West Riding and Midland) Armoured Division REME. The appointment is for five years.

MR. J. B. DRINNAN, general manager of the South Derbyshire area of the National Coal Board, announcing his resignation this week, is reported to have said. "I have decided that my future lies outside the service of the Board."

PROF. THOMAS ALTY, who has held the Cargill Chair of Natural Philosophy at Glasgow University since 1935, has been appointed Master of Rhodes University College, Grahamstown, South Africa. He was at one time employed as research physicist by I.C.I., Ltd.

A. C. Wickman, Ltd., Coventry, announces the appointment of MR. T. W. HAYES as export manager under the direction of MR. J. W. BUCHANAN, export director. Until recently Mr. Hayes was general manager of Hobourn Aero Components, Rochester. During the war he was assistant director of Machine Tools, Ministry of Aircraft Production.

MR. E. A. BEVAN, who recently resigned his directorship of Koller & Co. (England), Ltd., has been appointed managing director of Styrene Copolymers, Ltd., a company recently formed jointly by Petrochemicals, Ltd., and Lewis Berger & Sons, Ltd., to exploit the Berger patents on styrene copolymers from styrene and other raw materials produced by Petrochemicals, Ltd.

The Royal Photographic Society of Great Britain has made an award for research on photographic dyes to DR. LESLIE G. S. BROOKER, of the Eastman Kodak Research Laboratory, Rochester, New York. Dr. Brooker was honoured in "recognition of outstanding work over a number of years on photographic sensitising dyes, and especially on the relation between the colour and constitution of such dyes."

Dr. Neurath

DR. FREDERICK NEURATH, a regular contributor to THE CHEMICAL AGE, has been awarded the Golden Doctor Diploma of the University of Heidelberg, where 50 years ago, he became a Doctor *Philosophiæ Naturalis*. His doctor's dissertation dealt with the synthesis of camphor-like compounds and was honoured with the distinction *cum laude superavit*. He was at one time a manager of the Blackley Chemical Works Levinstein, Ltd., now part of the I.C.I. organisation, and later held a Ministerial position in Vienna. He came to England in 1939, became a British subject and is still active here. In the new document the University hails him as a scientist who, in responsible positions of the chemical industry, has always played an outstanding part in its development.

MR. R. J. COPELAND, J.P., chairman of W. T. Copeland & Sons, Ltd., Stoke-on-Trent, has received the C.B.E. for his services to the Boy Scout movement in Staffordshire. He was vice-president of the British Pottery Manufacturers' Federation in 1934 and a member of the Council for Art and Industry, 1934-36.

OBITUARY

The death occurred on June 19, as a result of a collision with a motor coach, of DR. WILLIAM HENRY BENTLEY, of Birkenhead, who had served the chemical industry with distinction, formerly as chemical adviser of the Clayton Aniline Company and more recently in the same capacity with William Blythe & Co., Ltd., and John Riley & Sons, Ltd.

Monsanto Appointments

Four Executive Changes

IT is announced that MR. SYDNEY SMITH, production manager at Monsanto's Ruabon plant, has been appointed works manager at the company's new £2 million works at

Mr. Sidney Smith

Newport, Monmouthshire. Joining Monsanto in 1930 as a plant chemist, Mr. Smith subsequently served as group chemist and divisional superintendent of production in the Intermediates Division. He goes to Newport—on July 1—with 36 years' experience in the chemical industry behind him, during which he has done important work in developing salicylates processes.

The duties of production manager at Ruabon are being undertaken by DR. W. A. HAYWARD, formerly divisional manager of the Heavy Chemicals Divisiou, who joined Monsanto from the Anglo-Iranian Oil Company in 1941 as group chemist in charge of phenol and phthalic anhydride manufacture.

The new divisional manager of the Heavy Chemicals Division is DR. N. B. DYSON, who came to Monsanto in 1934 from the Anglo-Scottish Beet Sugar Corporation, and has since served in the rubber chemicals, salicylates and phenol groups.

DR. E. W. BODYCOTE, who now becomes group supervisor of the Phenol Group, joined Monsanto last year from the I.C.I. Dyestuffs Division, where he was engaged in research on dyestuffs manufacture.

Back to Coal.—Highams, Ltd., manufacturers of cotton sheets and blankets, Accrington, have decided to reconvert to coal-burning and to write off £12,927 spent on installing oil-burning plant after last year's coal crisis.

Chemical Engineering

New Course at Durham University

BEGINNING in October, King's College, Newcastle-upon-Tyne, will offer a two-year post-graduate course in chemical engineering leading to the degree of Master of Science of the University of Durham. The course will be available to graduates in mechanical engineering or to those who possess some equivalent degree or qualification.

The opportunity has been taken to link with chemical engineering the teaching of fuel technology which has hitherto been carried out by individual departments as required. Lecturers in chemical engineering and fuel technology have been appointed and the additional teaching in chemistry and engineering subjects required for the new course will be provided by the respective departments. The course is under the direction of the Professor of Mechanical and Marine Engineering.

Scope of Studies

The main subjects of study during the two years of the course will include, in the field of chemical engineering, materials of construction and the design of chemical plant, the flow of fluids and the transfer of heat and matter and the various unit operations. The fuel technology course will include the fuel industries, steam, power and industrial gases.

Special instruction has been arranged in the three main branches of chemistry to meet the requirements of this course and a series of lectures will also be given on the economic, legal, health and safety aspects of chemical engineering. Practical work will be carried out in a new fuel technology laboratory and in a new chemical engineering laboratory which will house a number of small scale plants. Regular visits to works will also be made throughout each session.

More Petroleum Products

A start is shortly to be made on the installation for producing petroleum-based chemicals (in co-operation with the Distillers' Company), reports the chairman of the Anglo-Iranian Oil Company in his annual statement to stockholders. In the Middle East developments are rapidly being made which will increase shipments from Kuwait, and the company's refineries at Llandarcy and Grangemouth are expected this year to reach the higher capacity of 850,000 tons and 600,000 tons respectively. The company has earmarked £30 million for the provision of another refinery in the Isle of Grain.

Home News Items

Exhibition Revived.—The 48th Chemists' Exhibition, the first to be held since war, will take place at the Central Hall, Westminster, from September 20-24.

Workers' Savings.—According to figures issued by the National Savings Committee, chemical workers represent an important section among industrial savings groups. Membership in large firms in a number of trades has increased by 60,000 during the past year and a total of nearly £20 million has been contributed by factory, shop and office workers in six months.

Handling of Dangerous Chemicals.—At an inquest held at Stapleford, Derbyshire, last week on Reginald Lacey, an employee in the analytical department of Boots' Pure Drug Company at Beeston, who collapsed and died after cleaning silver nitrate stains with cyanide, the jury added a rider that dangerous chemicals should be kept under stricter supervision, even though assistants were frequently warned about handling them.

Ammunition Smelting Explosion.—Twelve men were injured on June 12 in an explosion during the smelting of empty shells at the Rotherham smelting shop of the Steel, Peach, and Tozer branch of the United Steel Companies, Ltd. Three were detained in hospital. Special precautions are taken to see that no live ammunition is passed for melting. An explosion occurred at the works four months ago.

Awards for Suggestions.—Recent prize-winning suggestions by Post Office employees to improve the services included a jig to speed up the replacement of clutch components; a method of avoiding oil-pipe breakages in motor vehicles; a means of re-covering overflow meters in connection with a certain type of automatic telephone exchange and an improved method of checking surcharge adjustments in telephone accounts. More than £40,000 has been awarded since the scheme began in 1906.

Rayon Weavers Criticised.—A condemnation of the frequent mis-handling and misuse of rayons by weavers was made in Manchester last week by Dr. C. M. Whittaker, a director of Courtaulds, Ltd. He said it was disappointing to find that, having taken great care in delivering rayons to the trade, the marketed products were "made from badly spun yarns, full of weaving faults, and the cloth so strained in processing" that relaxation shrinkage of anything up to 15 per cent. occurred.

£1,000,000 Steel Plant.—A contract worth over £1 million for the erection of steel strip and tin plate producing plant at Abbey Works, Port Talbot, has been placed with a Sheffield firm, Davy & United Engineering Co., Ltd., by the newly-formed Steel Company of Wales. The project forms part of the latter company's £60 million development scheme.

Less Coal From Pits.—Coal production last week, totalled 4,190,500 tons, 15,400 tons less than in the week ended June 12 and 76,000 tons less than in the first week in June. The reduction was due to reduced activity in the pits, opencast coal, 271,400 tons being the largest quantity produced since the end of May.

Alkali Ship.—The fourth of a fleet of five Diesel-engined cargo boats being built for I.C.I. (Alkali), Ltd., by W. J. Yarwood and Sons, was launched from the docks at Northwich last week by Mrs. Barbara Batty, wife of Mr. J. K. Batty, joint managing-director and secretary of I.C.I. (Alkali). The ship, *Cuddington*, will be put into service on the Northwich-Liverpool route.

Coal Board's Research Proposal.—Sir James French, chairman, revealed at a recent meeting of the governors of the Royal Technical College, Glasgow, that the National Coal Board had proposed that a pneumocopiosis research unit should be established there. The Scottish Division of the NCB was prepared to make a grant of £1500 a year for three years for this.

Scottish Afforestation Progress.—Development of a forest products industry in Scotland has been further advanced by the work of the Forestry Commision in Scotland. During the past 12 months, 24 million trees have been planted over 16,000 acres; a total of 375,000 acres is planned. In anticipation, industrialists are stated to be planning already the development of industries to service the textile, paper making, and allied industries.

Soft Drinks Order Amended.—The Minister of Food has amended the Soft Drinks Order, 1947, to exclude from the provisions governing ingredients soft drinks not sold to a retailer or by retail. This amendment enables a manufacturer of flavouring compounds, which are technically soft drinks but may not necessarily conform to the provisions of the Order as to ingredients, to sell his products to other manufacturers. Soft drinks for sale to the public are not affected.

American Chemical Notebook

From Our New York Correspondent

AT a meeting of the Magnesium Association in New York last week, at which both foreign and domestic prospects for increased uses of magnesium parts and products were discussed, Dr. T. H. McConica, director of the Dow Chemical Company, said that, while American consumption of the light metal is increasing, it is still far behind the European rate. In England per capita consumption of the light metal was more than twice that of the U.S.A. Even in Germany, which was devoting a large part of its industrial production to military uses during 1939, the per capita consumption in civilian products was greater than the present American level. Dr. McConica attributed the wider foreign use of magnesium products to the advantages afforded in weight, ease of casting and ability to stand up under stress. It was revealed at the meeting that the U.S. Air Corps has allotted large contracts to aircraft manufacturers and new machines built under this programme will contain higher proportions of magnesium than during the war because of the larger number of magnesium parts in jet propulsion engines.

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The first nuclear energy plant built with the main purpose of producing power, the (U.S.) General Electric Company's experimental atomic power plant at the Knolls Atomic Power Laboratory, near Schenectady, New York, is expected to be in operation in two to four years, and its output used as a source of heat for conventional generating equipment. This information has been given by Mr. H. A. Winne, vice-president of G.E.C. There is no indication that these forces can be converted directly into electricity. One of the many technical problems to be solved before atomic power becomes significant in U.S. economy, he said, was the disposal of radioactive waste. Construction of a new synchrotron capable of producing 300 million electron volts and perhaps ultimately 1000 million volts is now under way

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Further light on the U.S.A.'s difficulties in preserving a continuing supply of home-produced tin was given by Senator Morse, of Oregon, during the passage through the U.S. Senate last week of the Bill to extend domestic tin smelting operations for five years. He revealed that the operators of the Texas City smelting plant under the Reconstruction Finance Corporation, an American Dutch Company, had access to the low-grade Bolivian ores, which were the most readily available to the U.S.A., and predicted that if different arrangements were made those supplies were liable to be cut off. Bolivia, he said, was negotiating to give other countries access to this ore and had already contracted a certain supply to Argentina, although Argentina had not a single smelter of any size that could make use of the ore. It indicated, he said, that Argentina was going to stockpile the ore, apparently for international trade relations.

* * *

The arrival upon the American market of yet another preparation of benzene hexachloride insectide, Iso-Hex, is sponsored by the Sherwin Williams Company. A powder containing six per cent gamma isomer of benzene hexachloride, this represents the firm's first venture into this particular field. It is estimated that the company's output will mean an ultimate increase in domestic supplies of approximately 200 tons per month of a 12 per cent technical grade. Mr. Roger B. Friend, a lecturer in forest entomology at Yale University, discussing insect extermination, disclosed that the use of benzene hexachloride and other chemicals of this type may possibly exterminate whole species of insect pests. He recalled, however, that parasites sometimes developed resistance to insectides over a period of years. This had not yet happened in respect of the newer products but this possibility had to be borne in mind.

* * *

The Du Pont Company has announced that, to meet rising costs of raw materials, production and shipping, prices of metallic sodium, cyanide compounds, trichloroethylene and hydrogen and sodium peroxides will be increased on July 1. The new price of metallic sodium will be 16½ cents per lb.; sodium cyanide 14 cents per lb.; trichloroethylene 10½ cents per lb.; sodium peroxide 16 cents and 35 per cent hydrogen peroxide 20½ cents per lb. Other cyanide compounds will be increased proportionately. The new prices of sodium, cyanide compounds and the peroxides represent the first increases since 1918.

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Specialists of E. I. du Pont & Co., Merck & Co. and other leading industrial organisations are co-operating with lecturers of Columbia University as full-time instructors at a five-day training conference on industrial experimentation, being organised by the University's Engineering School in New York, September 14-18. The course is intended to give practical instruction in various phases of industrial technique to qualified persons with experience in industry.

Overseas News Items

Australian Coal Deposits.—The first discovery of hard coal in Northern Australia is reported to have been made in the neighbourhood of Downs Station, some 480 miles south of Darwin.

S. African Wattle Bark.—Demand for S. African wattle bark is continually increasing and producers report a rise in exports to all the important markets. The basic export price for wattle bark extract advanced recently by £7 10s. per ton.

French Iron and Steel.—Coal production in France during April amounted to over four million metric tons, or about 110 per cent. of the total mined in the same period in 1938. Increased production in respect of crude and finished steel, pig-iron and cement were also recorded.

Polish Chemicals in 1947.—The total value of production of the Polish chemical industry in 1947 is stated by the Polish authorities to have been £23 million, adjusted to correspond with 1937 prices. Over 44,226 persons were employed. In many branches, the chemical industry has exceeded its pre-war output.

Progress by U.S. Tin Co.—Between 13,500 and 14,000 long tons of fine tin will be produced in 1948 by Patino Mines and Enterprises Consolidated, Inc., as against only 10,612 long tons last year. It is stated that the labour situation at the company's mines in Bolivia is at present encouraging and the relationship between workers and management has improved compared with a year ago.

Oil News from Chile.—The Chilean Corporacion de Fomento states in a report on exploratory drillings for oil in Tierra del Fuego (the southernmost part of Chile), that it represents "one large oil depôt." Chilean and United States oil geologists are reported to have proved the existence of oil to the south of Mount Manantiales, in the vicinity of which there are already known oil occurrences.

Australian Tantalum.—The formation of a new company for the mining and processing of rare metals in Western Australia has been announced by Dr. D. Buller-Murphy, chairman of Tantalite, Ltd. The metals to be treated include tantalum, which at present sells at £36,000 per ton, and a processing plant is to be established at Welshpool, near Perth. The chairman claimed that tantalum deposits owned by the company at Wodgina are the richest in the world.

Portuguese Petroleum Concession.—The Portuguese Government has recently granted a five-year concession to the Mozambique Gulf Oil Company to search for oil, natural gas, sulphur and helium. The company will incur an annual expenditure of $600,000.

S. African Coal for New Zealand.—As a result of a recent trade agreement, New Zealand is to import annually 100,000 tons of South African coal. Supply difficulties and the need to conserve dollars influenced the decision.

Lower Shellac Sales in U.S.—A sharp drop in the demand for luxury goods, including gramophone records, is reported to be mainly responsible for the reduction in shellac sales in the U.S.A. The present high price quoted by Indian producers is another contributory factor.

Austria to Produce Penicillin.—An Austrian chemical firm is reported to have established a penicillin plant in the Tyrol and intends to start production within the next few weeks. Output will consist chiefly of penicillin plasters as the manufacture of penicillin alone is not considered economical, in view of the high technical standard reached by foreign production.

Swiss Metallurgy.—The recent completion at their Klus ironworks of a new laboratory for chemical-technical equipment, hydraulics and water engineering is recorded in the annual report of L. von Roll's Ironworks, Gerlafinger, Switzerland. The metallurgical chemical laboratory, which serves the company's foundries, several of which have been reconstructed and enlarged, has also been largely expanded.

Venezuelan Oil Concessions.—Dr. Battisti, president of the Venezuelan Petrol Bureau, speaking at the recent International Petroleum Exposition at Tulsa, U.S.A., said that Venezuela would not grant any more oil concessions. Existing rights would be respected but the Government was anxious to establish a broader national economy and desired to see present concessions fully exploited before granting new licences.

Superphosphate Plant for Finland.—A new factory now being erected in Finland for the manufacture of superphosphate is expected to start production at the end of the year. Initial annual output will be about 120,000 tons and later a production figure of 450,000 tons may be reached. A considerable reduction in Finland's foreign purchases of superphosphates will result when the new factory begins to operate.

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Laporte Group's Good Year

Big Building Programme

THE ultimate closing of the present titanium oxide plant at Luton, operated by a subsidiary company, National Titanium Pigments, Ltd., was forecast by Mr. L. P. O'Brien, chairman and managing director of Laporte Chemicals, Ltd., when he presented his annual statement at the 41st ordinary general meeting held last week. A new site had been acquired at Grimsby and permission sought from the Board of Trade to construct a factory.

The Grimsby site, Mr. O'Brien said, was considered more suitable for the manufacture and distribution of titanium oxide, and production at Luton, which could only be regarded as a large-scale pilot plant process, would be discontinued when the new factory attained maximum output.

Reviewing the work of the subsidiary and associated companies during the past twelve months, the chairman described operating conditions as generally more favourable and said that there had been fewer "involuntary stoppages" than in the preceding year. Except in the barium department, where a shortage of essential raw materials had been experienced during the first three months of 1947, practically all sections had registered increased output and sales.

The construction of new works at Warrington was likely to result later in the dismantling of the older hydrogen peroxide plant at Luton. The subsidiary, John Nicholson & Sons, Ltd., would be manufacturing barium chloride at Barnsley within the next few months, and was assured of a regular supply of raw materials.

For the year ended March 31, 1948, total profits amounted to £239,469, an increase of £91,925.

New Linseed Order

£10 per Ton More for Growers

MEASURES intended to promote the growing and conservation of supplies of linseed are contained in the Home-Grown Linseed (Control) Order, 1948, which came into force last month.

One of the main clauses of the Order prohibits the sale of home-grown linseed, except to an approved buyer, licensed by the Ministry of Food, or direct to the Ministry, and forbids the use of home-grown linseed for stock-feeding, except by the grower. Transactions concerning seed for sowing are not affected by the new regulations.

In addition, the present price payable by the Ministry for the 1947 crop of £45 per ton net weight *ex* farm will be increased to £55 per ton from August 1, 1948, and this will remain until further notice the standard price for linseed of 90 per cent purity.

STILL MORE EDIBLE OILS

A WARNING about the precarious position of the world's fat supply was made last week by Mr. J. C. A. Faure, Unilever's chief buyer of oils and fats, at the Brussels Congress of the International Association of Seed Crushers. He said: "Unless there is a very important increase in the world production any improvement in the Eastern diet can only be obtained at the expense of Europe. It seems impossible to believe that there are still those who think the East Africa groundnut scheme is unnecessary and that it will result in flooding the markets with groundnuts. When in full operation, it will yield only between 250,000 and 300,000 tons of oil. What is this against a world shortage?"

RISING TREND IN CONTINENTAL CHEMICAL RESULTS

THE annual report for 1947 issued by **Durand & Huguenin**, the Basle chemical and high-grade dyestuff manufacturers, records that the favourable business situation was maintained, turnover again increased and Continental and overseas sales expanded. The pre-war volume of sales in the U.S.A. had not been regained as domestic manufacturers had captured the positions formerly held by the company. Net profit rose from 892,408 to 1,103,298 Swiss francs, from which a dividend of 18 (16) per cent is being paid.

Société des Usines Chimiques Rhône-Poulenc, the leading French manufacturers of pharmaceuticals, reports a net profit, for 1947, of 152.4 (99.0) million francs, and has declared a gross dividend of 32 (21) francs, equal to slightly more than 21.1 (21) per cent on the increased share capital of 631.5 million francs (421.0 million). As a result of a recent issue, the capital was further increased to 1263 million francs.

Air Liquide (Société Georges Claude), reports a net profit for 1947 of 267.9 (198) million francs, out of which a dividend of 25 (36) francs, equal to 25 per cent, is being paid on the doubled share capital of 773 million francs. In addition, 503.38 (401.13) francs are to be distributed on each founder's share.

The Société d'Electro-Chimie, has resumed its dividend payment, the first since 1944, with a distribution of 6 per cent on the capital of 1159.9 million francs Net profit is shown at 73.2 (177.7) million francs.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

CATALIN, LTD., Waltham Abbey, chemical manufacturers. (M.26/6/48). May 24, £50,000 charge, to Pan Britannica Industries Ltd., charged on land and factory premises at Waltham Holy Cross. *Nil. September 4, 1947.

F.M.S. RUBBER PLANTERS ESTATES, LTD., London E.C. (M.26/6/48). May 12, two mortgages, to Industrial Rehabilitation Finance Board in Malaya, each securing all moneys due or to become due from the company to the mortgagees under or by reason or a guarantee respectively charged on property known as Jemima Estate, Siliau Negri Sembilan and Niyor Estate, Kluang, Johore *Nil. October 14, 1947.

Satisfactions

CHEMICALS AND ESSENTIAL OILS, LTD., London W.C. (MS.26/6/48). Satisfaction May 20, of deb. reg. May 30, 1946.

W. E. POWELL & CO., LTD., Croydon, manufacturing chemists. (MS.26/6/48). Satisfaction May 20, £600, registered May 8, 1946.

JASON & STUART PRODUCTS, LTD., Oldham, manufacturing chemists. (MS. 26/6/48). Satisfaction May 20, of deb. reg. August 15, 1947.

ACE PRODUCTS (MANCHESTER), LTD., Wilmslow, manufacturers of chemicals, etc. (MS.26/6/48). Satisfaction May 20, of charge reg. June 9, 1947.

Company News

The name of **Bryer Soldering Fluid, Ltd.**, 33 Woodcock Street, Birmingham, has been changed to Bryer Chemicals, Ltd., as from May 27, 1948.

Anglo-Iranian Oil Co., Ltd., achieved a record trading profit of £33,412,939 for the year ended December 31, 1947. Net profit was £18,564,857. The sum of £1,071,234 was paid in respect of preference dividends, and £6,041,250 for ordinary dividends.

The name of **Silf Co., Ltd.**, Vereker Buildings, Rathbone Place, London, W.1., has been changed to P. J. Williams Properties, Ltd., as from May 24, 1948.

The nominal capital of **Colloidal Chemists, Ltd.**, 35a Bessborough Place, London, S.W.1, has been increased beyond the registered capital of £2000 by £3000, in £1 shares.

The Standard Chemical Co., Ltd., Canada, has declared regular quarterly dividend of 10 cents per share on common shares and $1.25 per share on preferred shares, for the period to July 30.

Patino Mines and Enterprises Consolidated, Inc., has announced that the dividend payment would be 5s. a share, payable on July 9, in U.S. funds. This is double the dividend payment made in April.

British Drug Houses, Ltd., reports a net profit for the year ended December 31, 1947, of £90,362 as against £91,637 the previous year. A dividend of 5 per cent. has been declared on the cumulative preference shares, and 6 per cent. on the ordinary shares.

New Companies Registered

Clive Chemical Co., Ltd. (355,430).—Private company. Capital £500. Manufacturers of chemicals, fertilisers, etc. Directors: J. L. Powell and V. Roberts. Office: 9 Park Place, Cardiff.

Verminsecticide Co., Ltd. (455,414).—Private company. Capital £100. Manufacturers of insecticides, fungicides, disinfectants, vermin exterminators, etc. Reg. office: 60 New Oxford Street, W.1.

Biomisation, Ltd. (455,552).—Private company. Capital £500. Manufacturers of chemical and artificial manures and fertilisers, chemicals, etc. Directors: D. E. Nahum and E. G. Finch. Reg. office: The Grange, Uppermill, Saddleworth, Yorks.

D. S. Wood (Chemicals), Ltd. (455,386).—Private company. Capital £1000. Chemical merchants, chemical manufacturers, manufacturing chemists, etc. Sec.: R. L. Winterburn. Reg. office: 34 Baker Street, W.1.

T. Harrison & C., Ltd. (454,981).—Private company. Capital £5000. Objects: To acquire the business of essential oil distillers carried on by Frederick Harrison and Rowland Harrison as "T. Harrison & Co.," at "Burnley House," Burnley Road, Willesden, N.W.10. Directors: F. Harrison, and R. Harrison. Reg. office: "Burnley House," Burnley Road, Willesden, N.W.10.

Scottish Dyes, Ltd. (26,406).—Private company. Capital £300. Wholesale manufacturers of dyes and dye assistants, etc. Directors: J. M. McEwing, T. McAlpine and W. McAlpine. Reg. office: 420 Sauchiehall Street, Glasgow.

Wilkinson High Frequency, Ltd. (455,048).—Private company. Capital £1000. To acquire patents and inventions and to carry on the business of engineers, metallurgists, chemists, petroleum and oil refiners, manufacturers of chemical and other machinery and apparatus, etc. Directors: F. E. Wilkinson, C. B. D. Fox, Mrs. Violet H. Fox and Mrs. Lilian A. Bevan. Reg. office: Walsingham House, Seething Lane, E.C.3.

Dunston Iron Co.—Private company. Capital £10,000. To obtain an option from the Sheerbridge Coal and Iron Co. to acquire the blast furnaces, ironstone mines and properties and rolling mills, etc., now carried on by Sheerbridge Coal and Iron. Directors: Lord Aberconway, G. Nicholson, G. C. M. Jackson, T. E. Haslam, Lt.-Col. J. Leslie, F. W. Stokes, L. G. Hodges, N. M. Peech and A. V. Nicolle, all of whom are directors of leading steel, coal and engineering groups.

Chemical and Allied Stocks and Shares

STOCK market conditions during the past week have remained depressed, the only bright feature being a further rise in British Funds led by Electricity 3 per cents, which touched 100¼ in active dealings—the best level yet recorded for a nationalisation stock—before coming back to par. In the industrial section the beneficial effect of the Marshall Aid news was counteracted by the dock strike.

Movements in chemical and kindred shares were mostly small, but on balance have been mainly against holders in accordance with the prevailing trend. Imperial Chemical at 47s. 6d., however, rallied after touching 47s. 3d., and the market is still taking the view that the new shares are unlikely to be issued at a lower price than 40s. Monsanto Chemical 5s. ordinary were 58s. 1½d., Fisons 58s., Lawes Chemical 10s. shares marked 14s., and shares of companies making fertilisers attracted more attention. British Glues & Chemicals 4s. ordinary eased to 19s. 6d., and although the forthcoming results are generally expected to show a further increase in profits, the dividend is hardly likely to be raised above the previous year's 25 per cent in view of the voluntary limitation stipulation. Nevertheless, on the basis of a 25 per cent dividend, the yield at the current price exceeds 4⅞ per cent. Borax Consolidated at 60s. have been steady, British Aluminium were 49s., at which the yield is fully 4 per cent, and Dunlop Rubber eased to 70s., while Turner & Newall were 76s., and United Molasses 48s. Major & Co.'s 2s. shares have strengthened to 2s. 7½d. on the financial results.

Iron and steels again moved narrowly. Yields are still attractive in most cases and with production at record levels it is certain that net profits will be well maintained, consequently dividends should be at the same rate as last year. There is, of course, the question of nationalisation, but the market is still of the opinion that this will relate only to actual iron and steel production. Moreover, it is being assumed that nationalisation may be effected not by acquisition of all the shares of a particular company but only of a controlling interest in them. At their current level of 29s. 6d., Dorman Long yield over 5½ per cent, Colvilles at 34s. over 4⅝ per cent, and United Steel at 28s. over 5⅝ per cent. Stewarts & Lloyds were 53s. 4½d., and Babcock & Wilcox 67s. 6d., and although Tube Investment have eased to slightly under £6, there have been few sellers. Owing to absence of buyers jobbers have marked prices back as a precautionary measure.

Courtaulds eased to 38s. awaiting the full report and accounts. British Celanese receded to 20s. 3d., on the assumption that more capital may be required later in the year. Oils were unaffected by the large earnings disclosed by the Anglo-Iranian and Shell reports. Anglo-Iranian at £8 9/16, and Shell at 78s. 1½d. were in fact lower on balance, as buyers held off owing to the surrounding trend of markets. Ultramar Oil fell back 2s. 6d. to 75s. owing to hints that more capital will be required shortly. In other directions, Boots Drug at 49s. 3d. were easier following the accounts, which show a big increase in the stock-in-trade item—a feature of recent balance-sheets of companies with important retail interests. This doubtless reflects contraction in public spending power. Awaiting the financial results, Beechams deferred eased to 17s. 10½d., British Drug Houses 5s. shares were around 8s., and Glaxo Laboratories eased to £16¾.

Powder Metallurgy Conference.—An international congress of powder metallurgists is to be held from July 12-16 in Graz, organised by the Section Styria of the Society of Austrian Chemists. Details are obtainable from the chairman of the executive committee, Dr. R. Kieffer, Metallwerk Plansee, Reutte-Tyrol, or from Prof. Dr. G. T. Hüttig, Technical High School, Graz, Styria.

Prices of British Chemical Products

MODERATELY active trading conditions are again reported from the industrial chemicals market. Overseas inquiry continues to be persistent, while in the home market the demand remains steady, delivery specifications covering good volumes. The demand for the soda products is on an active scale and supplies particularly short of soda ash and caustic soda. Among the potash chemicals there has been a good market for the B.P. and technical grades of permanganate of potash, while available parcels of other potash chemicals are quickly taken up. Formaldehyde continues in good call and there has been no falling off in the demand for acetone, acetic acid and arsenic. Nor has there been any change in the lead oxides position, where the buying interest is fully sustained. The price position generally is steady and the undertone firm. So far as the coal-tar products market is concerned there has been little of fresh interest to report and the volume of new business is dictated by the supply position.

MANCHESTER.—The opening of the holiday season has to some extent eased the pressure for deliveries of textile and other descriptions of heavy chemical products on the Manchester market, but, apart from this factor, which is likely to make its influence felt over the next two or three months, steady trading conditions have been reported during the past week as regards both home trade and export business. New inquiries since last week have been in connection with a fairly wide range of products and actual new business has been reasonably substantial. The demand for fertilisers generally has been less in evidence. In the tar products market the demand for both the light and heavy classes has been well maintained.

GLASGOW.—There has been an improved tone in the Scottish chemical market during the past week. Demand, however, is well below normal for this time of the year, although the demand for coal tar products has shown an increase. Prices have been satisfactory. During the last few weeks prices have shown a welcome stability; in some cases there have been small decreases. In the export market conditions have been very active and buyers from India, Pakistan, Ceylon, and Siam have been noticeably more active than in previous weeks.

Price Changes

Rises: Sodium sulphate.

Reductions: Ammonium carbonate, bleaching powder, calcium chloride, lactic acid, mercurous chloride, phosphoric acid, sodium hyposulphite.

General Chemicals

Acetic Acid.—Maximum prices per ton: 80% technical, 1 ton, £64; 80% pure, 1 ton, £66; commercial glacial 1 ton £79; delivered buyers' premises in returnable barrels: £4 10s. per ton extra if packed and delivered in glass.

Acetic Anhydride.—Ton lots, d/d, 11¾d. per lb.

Acetone.—Maximum prices per ton, 1/5 tons, £76 10s.; single drums, £77 10s.; delivered buyers' premises in returnable drums or other containers having a capacity of not less than 45 gallons each. For delivery in non-returnable containers of 40/50 gallons, the maximum prices are £3 per ton higher. Deliveries of less than 10 gallons free from price control.

Alcohol, Industrial Absolute.—50,000 gal. lots, d/d, 2s. 7⅛d. per proof gallon; 5000 gal. lots, d/d, 2s. 10⅛d. per proof gal.

Alum.—Loose lump, £16 per ton, f.o.r. MANCHESTER: £16 10s.

Aluminium Sulphate.—Ex works, £11 10s. per ton d/d. MANCHESTER: £11 10s.

Ammonia, Anhydrous.—1s. 9d. to 2s. 3d. per lb.

Ammonium Bicarbonate. — MANCHESTER: £40 per ton d/d.

Ammonium Carbonate.—£42 per ton d/d in 5-cwt. casks. MANCHESTER: Powder, £50 d/d.

Ammonium Chloride. — Grey galvanising, £22 10s. per ton, in casks, ex wharf. Fine white 98%, £21 to £25 per ton. See also Salammoniac.

Ammonium Nitrate.—D/d, £18 to £20 per ton.

Ammonium Persulphate.—MANCHESTER: £5 per cwt. d/d.

Ammonium Phosphate.—Mono- and di-, ton lots, d/d, £78 and £76 10s. per ton.

Antimony Oxide.—£162 10s. per ton.

Antimony Sulphide.—Golden, d/d, as to quantity, etc., 4s. to 5s. per lb.

Arsenic.—Per ton, £40 5s. to £41 5s., according to quality, ex store.

Barium Carbonate.—Precip., d/d; 2-ton lots, £25 15s. per ton, bag packing, ex works.

Barium Chloride.—98/100% prime white crystals, 5-ton lots, £26 per ton, bag packing, ex works.

Barium Sulphate (Dry Blanc Fixe).—Precip., 4-ton lots, £26 10s. per ton d/d; 2-ton lots, £26 15s. per ton.

Bleaching Powder.—Spot, 35/37%, £11 10s. per ton in casks.

Borax.—Per ton for ton lots, in free 1-cwt. bags, carriage paid: Commercial, granulated, £30; crystals, £31; powdered, £31 10s.; extra fine powder, £32 10s. B.P., crystals, £39; powdered, £39 10s.; extra fine, £40 10s. Borax glass, per ton in free 1-cwt. waterproof paper-lined bags, for home trade only, carriage paid: lump, £77; powdered, £78.

Boric Acid.—Per ton for ton lots in free 1-cwt. bags, carriage paid: Commercial, granulated, £52; crystals, £53; powdered, £54; extra fine powder, £56. B.P., crystals, £61; powder, £62; extra fine, £64.

Calcium Bisulphide.—£6 10s. to £7 10s. per ton f.o.r. London.

Calcium Chloride.—70/72% solid, £5 15s per ton, ex store.

Charcoal, Lump.—£25 per ton, ex wharf. Granulated, £30 per ton.

Chlorine, Liquid.—£29 per ton, d/d in 16/17-cwt. drums (3-drum lots).

Chrometan.—Crystals, 5½d. per lb.

Chromic Acid.—1s. 10d. to 1s. 11d. per lb., less 2½%, d/d U.K.

Citric Acid.—Controlled prices per lb., d/d buyers' premises. For 5 cwt. or over, anhydrous, 1s. 6½d., other, 1s. 5.; 1 to 5 cwt., anhydrous, 1s. 9d., other, 1s. 7d. Higher prices for smaller quantities.

Cobalt Oxide.—Black, delivered, 6s. 7d. per lb.

Copper Carbonate.—MANCHESTER: 1s. 8d. per lb.

Copper Chloride.—(53 per cent), d/d, 1s. 10d. per lb.

Copper Oxide.—Black, powdered, about 1s. 4½d. per lb.

Copper Nitrate.—(53 per cent), d/d, 1s. 8d. per lb.

Copper Sulphate.—£42 10s. per ton f.o.b., less 2%, in 2-cwt. bags.

Cream of Tartar.—100%, per cwt., from 201s. to 205s. per cwt. lots, d/d.

Ethyl Acetate.—10 tons and upwards, d/d, £115 per ton.

Formaldehyde.—£31 per ton in casks, according to quantity, d/d. MANCHESTER: £32.

Formic Acid.—85%, £64 per ton for ton lots, carriage paid. 90%, £67 5s. per ton.

Glycerine.—Chemically pure, double distilled 1260 s.g., 123/1 per cwt. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

Hexamine.—Technical grade for commercial purposes, about 1s. 4d. per lb.; free-running crystals are quoted at 2s. 1d. to 2s. 3d. per lb.; carriage paid for bulk lots.

Hydrochloric Acid.—Spot, 7s. 6d. to 8s 9d. per carboy d/d, according to purity, strength and locality.

Hydrofluoric Acid.—59/60%, about 1s. to 1s. 2d. per lb.

Hydrogen Peroxide.—1s. 0½d. per lb. d/d, carboys extra and returnable.

Iodine.—Resublimed B.P., 10s. 4d. to 14s. 6d. per lb., according to quantity.

Iron Sulphate.—F.o.r. works, £3 15s. to £4 per ton.

Lactic Acid.—Pale tech., £70 per ton; dark tech., £60 per ton ex works; barrels returnable.

Lead Acetate.—White, 110s. to 115s. per cwt., according to quantity.

Lead Carbonate.—British dry, ton lots, d/d. £116 per ton.

Lead Nitrate.—About £115 per ton d/d in casks. MANCHESTER: £115.

Lead, Red.—Basic prices per ton: Genuine dry red lead, £106; orange lead, £118. Ground in oil: red, £132; orange, £144. Ready-mixed lead paint: red, £140; orange, £152 (subject to increase of £1 10s. per ton).

Lead, White.—Dry English, in 8-cwt. casks, £116 10s. per ton. Ground in oil, English, in 5-cwt. casks, £141 per ton.

Lime Acetate.—Brown, ton lots, d/d, £18 to £20 per ton; grey, 80-82 per cent, ton lots, d/d, £22 to £25 per ton.

Litharge.—£103 10s. to £106 per ton.

Lithium Carbonate.—7s. 9d. per lb. net.

Magnesite.—Calcined, in bags, ex works, £18 5s.

Magnesium Carbonate.—Light, commercial, d/d, £70 per ton.

Magnesium Chloride.—Solid (ex wharf), £27 10s. per ton.

Magnesium Oxide.—Light, commercial, d/d, £160 per ton.

Magnesium Sulphate.—£12 to £14 per ton.

Mercuric Chloride.—Per lb., for 2-cwt. lots, 7s. 6d.; smaller quantities dearer.

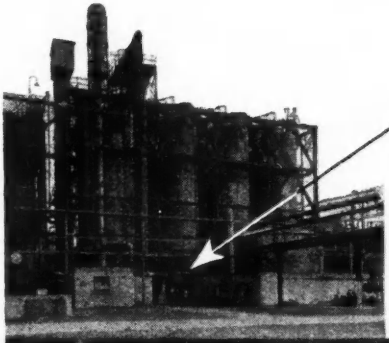
Mercurous Chloride.—8s. to 9s. per lb., according to quantity.

Mercury Sulphide, Red.—Per lb., from 10s. 3d. for ton lots and over to 10s. 7d. for lots of 7 to under 30 lb.

Methanol.—Pure synthetic, d/d, £28 to £38 per ton.

Methylated Spirit.—Industrial 66° O.P. 100 gals., 4s. 10d. per gal.; pyridinised 64° O.P. 100 gal., 4s. 11d. per gal.

Nickel Sulphate.—F.o.r. works, 3s. 4d. per lb.



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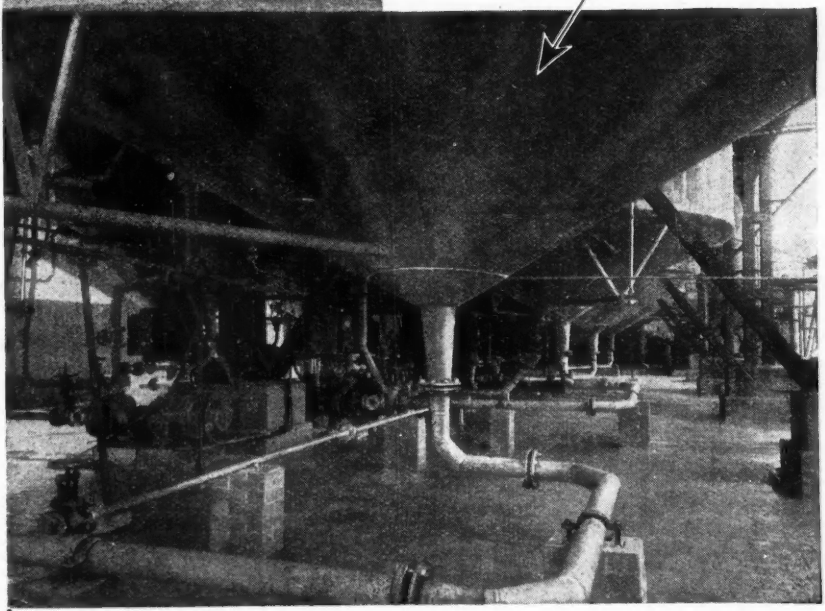

BAMAG plants

for nitrogenous chemicals and fertilisers

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Sales and Export Department : UNIVERSAL HOUSE, 60 BUCKINGHAM PALACE ROAD, LONDON, S.W.1

SLOane 9282 Cables : Bamag, London

B2061-C1

Nitric Acid.—£24 to £26 per ton, ex works.

Oxalic Acid.—£128 to £133 per ton packed in free 5-cwt. casks.

Paraffin Wax.—Nominal.

Phosphoric Acid.—Technical (S.G. 1.500). ton lots, carriage paid, £61 per ton; B.P. (S.G.1.750), ton lots, carriage paid, 1s. 1d. per lb.

Phosphorus.—Red, 3s. per lb. d/d; yellow, 1s. 10d. per lb. d/d.

Potash, Caustic.—Solid, £65 10s. per ton for 1-ton lots; flake, £76 per ton for 1-ton lots. Liquid, d/d, nominal.

Potassium Bichromate. — Crystals and granular, 9¾d. per lb.; ground, 10¾d. per lb., for not less than 6 cwt.; 1-cwt. lots, ½d. per lb. extra.

Potassium Carbonate.—Calcined, 98/100%, £64 per ton for 1-ton lots, ex store; hydrated, £58 for 1-ton lots.

Potassium Chlorate.—Imported powder and crystals, nominal.

Potassium Chloride.—Industrial, 96 per cent, 6-ton lots, £16.10 per ton.

Potassium Iodide.—B.P., 8s. 8d. to 12s. per lb., according to quantity.

Potassium Nitrate.—Small granular crystals, 76s. per cwt. ex store, according to quantity.

Potassium Permanganate.—B.P., 1s. 8½d. per lb. for 1-cwt. lots; for 3 cwt. and upwards, 1s. 8d. per lb.; technical, £7 14s. 3d. to £8 6s. 3d. per cwt., according to quantity d/d.

Potassium Prussiate.—Yellow, nominal.

Salammoniac.—First lump, spot, £48 per ton; dog-tooth crystals, £50 per ton; medium, £48 10s. per ton; fine white crystals, £21 to £25 per ton, in casks, ex store.

Salicylic Acid.—MANCHESTER: 1s. 11d. to 3s. 1d. per lb. d/d.

Soda Ash.—58° ex depôt or d/d, London station, £7 12s. 6d. to £8 7s. 6d. per ton.

Soda, Caustic. — Solid 76/77%; spot, £18 4s. per ton d/d.

Sodium Acetate.—£41 per ton, ex wharf.

Sodium Bicarbonate.—Refined, spot, £11 per ton, in bags.

Sodium Bichromate.—Crystals, cake and powder, 8d. per lb.; anhydrous, 7½d. per lb., net, d/d U.K. in 7-8 cwt. casks.

Sodium Bisulphite. — Powder, 60/62%, £28 7s. 6d. per ton d/d in 2 ton lots for home trade.

Sodium Carbonate Monohydrate.—£25 per ton d/d in minimum ton lots in 2-cwt. free bags.

Sodium Chlorate.—£45 to £47 per ton.

Sodium Cyanide.—100 per cent basis, 8d. to 9d. per lb.

Sodium Fluoride.—D/d, £4 10s. per cwt.

Sodium Hyposulphite.—Pea crystals 22s. 6d. per cwt. (2-ton lots); commercial, 1-ton lots, £16 per ton carriage paid. Packing free.

Sodium Iodide.—B.P., for not less than 28 lb., 10s. 2d. per lb.

Sodium Metaphosphate (Calgon).—Flaked, loose in metal drums, £103 ton.

Sodium Metasilicate.—£19 5s. per ton, d/d U.K. in ton lots.

Sodium Nitrate.—Chilean Industrial, 97-98 per cent, 6-ton lots, d/d station, £19 15s. per ton.

Sodium Nitrite.—£22 per ton.

Sodium Percarbonate.—12½% available oxygen, £7 per cwt. in 1-cwt. drums.

Sodium Phosphate.—Di-sodium, £32 10s. per ton d/d for ton lots. Tri-sodium, £62 per ton d/d for ton lots.

Sodium Prussiate.—9d. to 9½d. per lb. ex store.

Sodium Silicate.—£6 to £11 per ton.

Sodium Silicofluoride.—Ex store, nominal.

Sodium Sulphate (Glauber Salt).—£8 per ton d/d.

Sodium Sulphate (Salt Cake).—Unground. £6 per ton d/d station in bulk. MANCHESTER: £4 15s. per ton d/d station.

Sodium Sulphide. — Solid, 60/62%, spot. £23 per ton, d/d, in drums; broken, £23 15s. per ton, d/d, in casks.

Sodium Sulphite.—Anhydrous, £29 10s. per ton; pea crystals, £20 10s. per ton d/d station in kegs; commercial, £12 to £14 per ton d/d station in bags.

Sulphur.—Per ton for 4 tons or more, ground, £14 12s. 6d. to £16 17s. 6d., according to fineness.

Sulphuric Acid.—168° Tw., £6 10s. 2d. to £7 10s. 2d. per ton; 140° Tw., arsenic-free, £5 2s. 6d. per ton; 140° Tw., arsenious, £4 15s. per ton. Quotations naked at sellers' works.

Tartaric Acid.—Per cwt., for 10 cwt. or more, £15 8s.; 5 to 10 cwt., £15 9s. 6d.; 2 to 5 cwt., £15 11s.; 1 to 2 cwt., £15 13s. Less than 1 cwt., 3s. 1d. to 3s. 3d. per lb. d/d, according to quantity.

Tin Oxide.—1-cwt. lots d/d £25 10s.

Titanium Oxide.—Comm., ton lots, d/d, (56 lb. bags), £97 per ton.

Zinc Oxide.—Maximum prices per ton for 2-ton lots, d/d; white seal, £75 10s.; green seal, £74 10s.; red seal, £73.

Zinc Sulphate.—No quotation.

Rubber Chemicals

Antimony Sulphide.—Golden, 3s. to 4s. per lb. Crimson, 2s. 7½d. to 3s. per lb.

Arsenic Sulphide.—Yellow, 1s. 9d. per lb.
Barytes.—Best white bleached. £8 3s. 6d. per ton.
Cadmium Sulphide.—6s. to 6s. 6d. per lb.
Carbon Bisulphide.—£37 to £41 per ton, according to quality, in free returnable drums.
Carbon Black.—6d. to 8d. per lb., according to packing.
Carbon Tetrachloride.—£50 10s. to £53 10s. per ton, according to quantity.
Chromium Oxide.—Green, 2s. per lb.
India-rubber Substitutes.—White, 10 5/16d. to 1s. 5¾d. per lb.; dark, 10¼d. to 1s. per lb.
Lithopone.—30%, £33 12s. 6d. per ton.
Mineral Black.—£7 10s. to £10 per ton.
Mineral Rubber, "Rupron."—£20 per ton.
Sulphur Chloride.—7d. per lb.
Vegetable Lamp Black.—£49 per ton.
Vermilion.—Pale or deep, 15s. 6d. per lb. for 7-lb. lots.

Nitrogen Fertilisers

Ammonium Phosphate.—Not quoted—temporarily unobtainable.
Ammonium Sulphate.—Per ton in 6-ton lots, d/d farmer's nearest station, in January, £10 5s., rising by 1s. 6d. per ton per month to March, 1948.
Calcium Cyanamide.—Nominal; supplies very scanty.
Concentrated Fertilisers. — Per ton d/d farmer's nearest station, I.C.I. No. 1 grade, where available, £14 18s. 6d.
"Nitro-Chalk."—£10 4s. per ton in 6-ton lots, d/d farmer's nearest station.
Sodium Nitrate.—Chilean super-refined for 6-ton lots d/d nearest station, £17 5s. per ton; granulated, over 98%, £16 per ton.

Coal-Tar Products

Benzol.—Per gal. ex works: 90's, 2s. 6d.; pure, 2s. 8½d.; nitration grade, 2s. 10½d.
Carbolic Acid. — Crystals, 11½d. per lb. Crude, 60's, 3s. 6d. to 4s. MANCHESTER: Crystals, 9½d. to 11½d. per lb., d/d; crude, 4s. 3d., naked, at works
Creosote.—Home trade, 6½d. to 9¾d. per gal., according to quality, f.o.r. maker's works. MANCHESTER: 6½d. to 9¾d. per gal.
Cresylic Acid.—Pale, 97%, 3s. 6d. per gal.; 99%, 4s. 2d.; 99.5/100%, 4s. 4d. American, duty free, 4s. 2d., naked at works. MANCHESTER: Pale, 99/100%, 4s. 4d. per gal.
Naphtha.—Solvent, 90/160°, 2s. 10d. per gal. for 1000-gal. lots; heavy, 90/190°, 2s. 4d. per gal. for 1000-gal. lots, d/d. Drums extra; higher prices for smaller lots. Controlled prices.

Naphthalene.—Crude, tom lots, in sellers' bags, £8 1s. to £12 13s. per ton according to m.p.; hot-pressed, £14 15s. to £15 14s. per ton, in bulk ex works; purified crystals, £28 to £43 5s. per ton. Controlled prices.

Pitch.—Medium, soft, home trade, 100s. per ton f.o.r. suppliers' works; export trade, £7 10s. per ton f.o.b. suppliers' port. MANCHESTER: 100s. f.o.r.

Pyridine.—90/140°, 18s. per gal.; 90/160°, 14s. MANCHESTER: 16s. 6d. to 20s. per gal.

Toluol.—Pure, 3s. 2½d. per gal.; 90's, 2s. 4d. per gal. MANCHESTER: Pure, 3s. 2½d. per gal. naked.

Xylol.—For 1000-gal. lots, 3s. 3½d. to 3s. 6d. per gal., according to grade, d/d.

Wood Distillation Products

Calcium Acetate.—Brown, £15 per ton; grey, £22.

Methyl Acetone.—40/50%, £56 to £60 per ton.

Wood Creosote.—Unrefined, from 3s. 6d per gal., according to boiling range.

Wood Naphtha.—Miscible, 4s. 6d to 5s. 6d. per gal.; solvent, 5s 6d. to 6s. 6d. per gal.

Wood Tar.—£6 to £10 per ton.

Intermediates and Dyes (Prices Nominal)

m-**Cresol** 98/100%.—Nominal.

o-**Cresol** 30/31° C.—Nominal.

p-**Cresol** 34/35° C.—Nominal.

Dichloraniline.—2s. 8½d. per lb.

Dinitrobenzene.—8½d. per lb.

Dinitrotoluene.—48/50° C., 9½d. per lb.; 66/68° C., 1s.

p-**Nitraniline.**—2s. 5d. per lb.

Nitrobenzene.—Spot, 5½d. per lb. in 90-gal. drums, drums extra, 1-ton lots d/d buyers' works.

Nitronaphthalene.—1s. 2d. per lb.; P.G. 1s. 0½d. per lb.

o-**Toluidine.**—1s. per lb., in 8/10-cwt. drums, drums extra.

p-**Toluidine.**—2s. 2d. per lb., in casks.

m-**Xylidine Acetate.**—4s. 5d. per lb., 100%.

Latest Oil Prices

LONDON.—June 23.—For the period ending June 26, 1948 (August 14, 1948, for refined oils). Per ton, naked, ex mill, works or refinery, and subject to additional charges according to package; LINSEED OIL, crude, £200. RAPESEED OIL, crude, £190. COCONUT OIL, crude, £106 refined deodorised, £112 refined hardened deodorised, £116. PALM KERNEL OIL, crude, £105 10s., refined deodorised, £112; refined hardened deodorised, £116. PALM OIL (per ton c.i.f.), in returnable casks, £99 5s.; in drums on loan, £98 15s., in bulk, £97 15s. GROUNDNUT OIL, crude, £110 10s.; refined deodorised, £114, refined hardened deodorised, 40 deg. £118. WHALE OIL, refined hardened, 42 deg., £117; refined hardened, 46/48 deg., £118. ACID OILS, Groundnut, £94; soya, £92; coconut and palm-kernel, £97 10s. ROSIN: Wood, 40s. 6d. to 48s.; gum, 56s. to 62s. 6d. per cwt., ex store, according to grade. TURPENTINE, American, 87s. per cwt. in drums or barrels, as imported (controlled price).

CLASSIFIED ADVERTISEMENTS

EDUCATIONAL

SITUATIONS VACANT

None of the vacancies in these columns relates to a man between the ages of 18 and 50 inclusive, or a woman between the ages of 18 and 40 inclusive, unless he or she is exempted from the provisions of the Control of Engagement Order, or the vacancy is for employment exempted from the provisions of that order.

AN opening occurs for an Advertisement Representative in London on THE CHEMICAL AGE. First class opportunity for advancement. Full details marked "Personal" to The Publisher, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

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THE CHEMICAL AGE invites applications, preferably from those with some experience in industrial chemistry and chemical engineering, for a post on the sub-editorial staff. Full details, in confidence, to the MANAGING DIRECTOR, 154, Fleet Street, London, E.C.4.

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One—Unused Mild Steel **AUTOCLAVE,** 6 ft. diam. by 9 ft. 6 in. long by ⅜ in. thick riveted plate, arranged for rotating through gearing.

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